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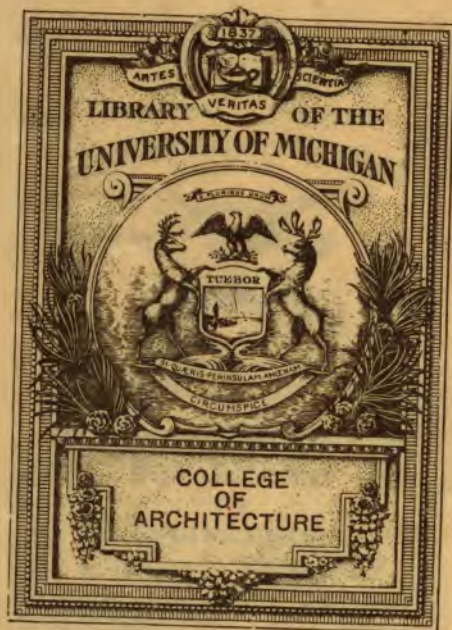
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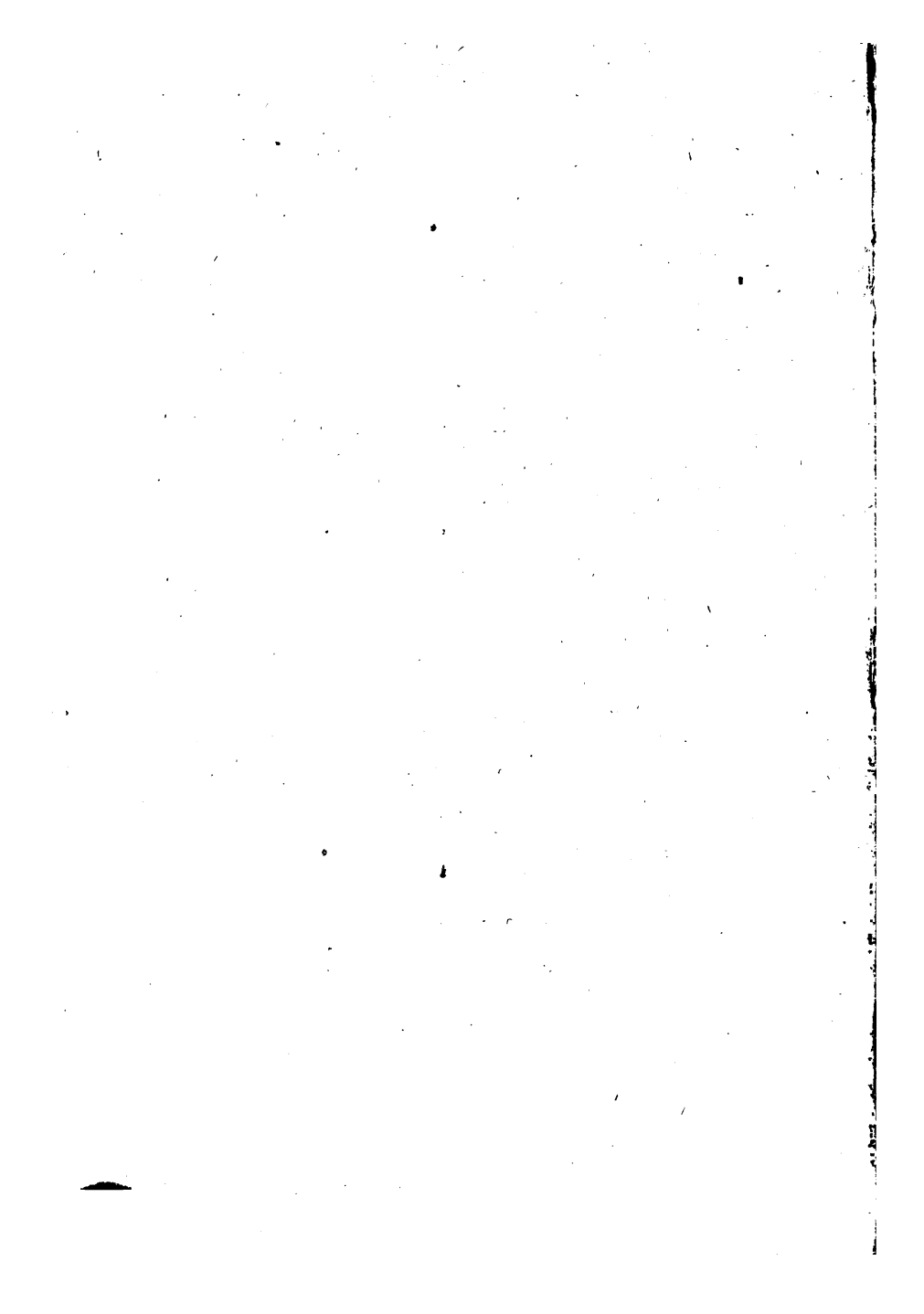
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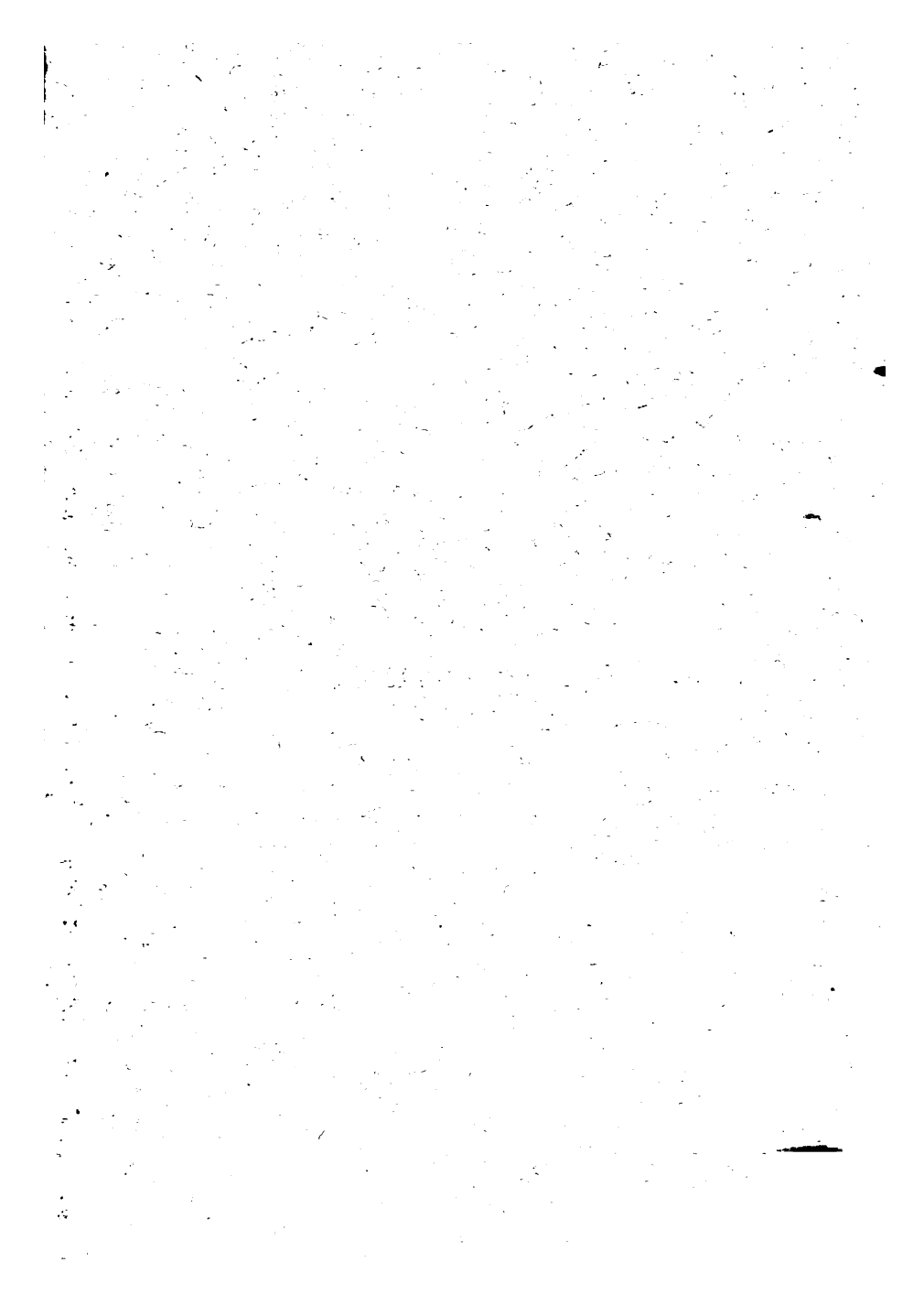
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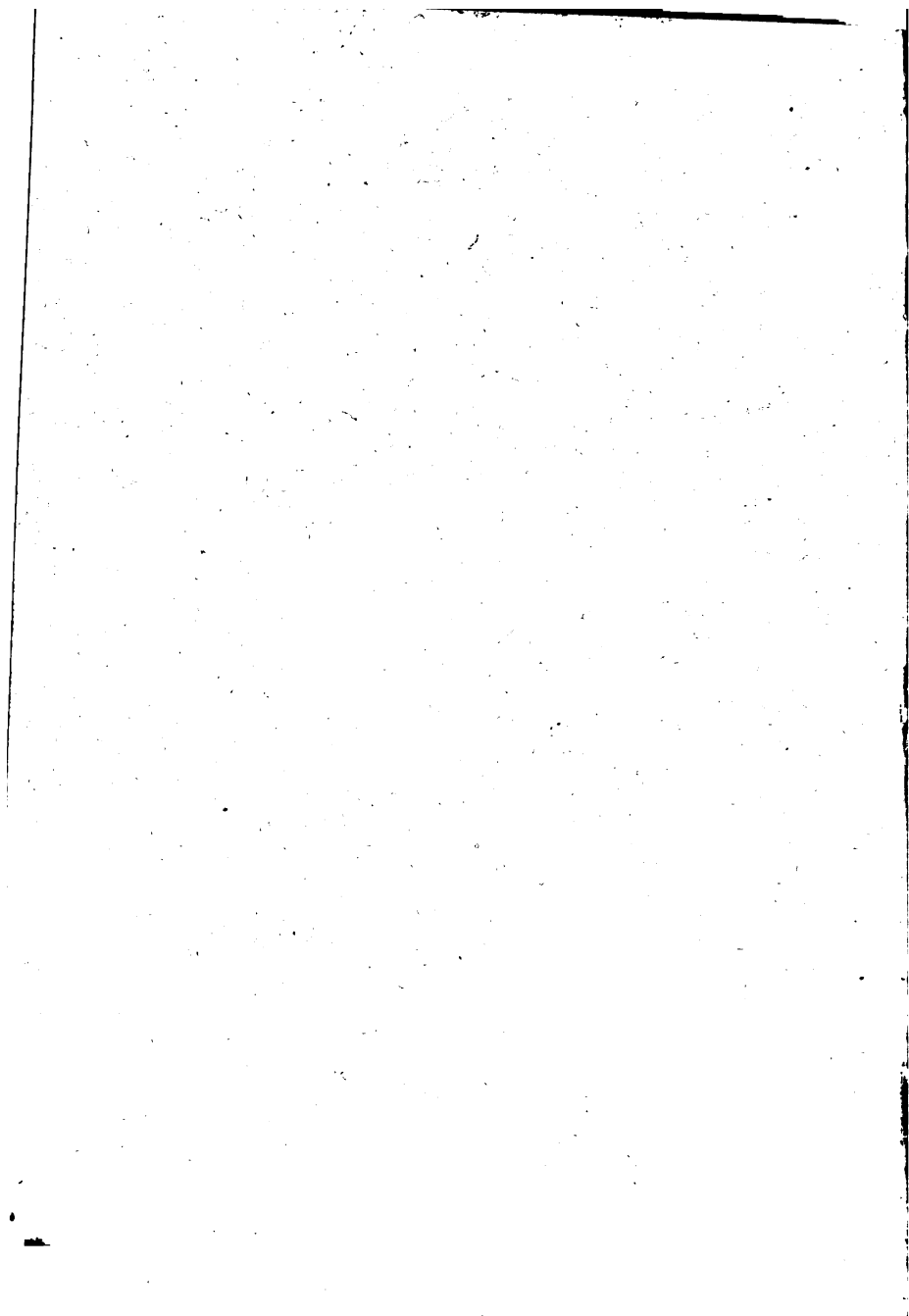
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THE ART OF BRASS REPOUSSÉ.

THE
ART
OF
BRASS
REPOUSSÉ.

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Fig. 1.

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A MANUAL
OF PRACTICAL INSTRUCTION
IN THE
ART OF BRASS REPOUSSÉ
FOR
AMATEURS.

BY
T. G. & W. E. GAWTHORP
(Art Metal Workers to H.M. King Edward VII.).

WITH PREFATORY NOTE BY LADY HUGGINS.

FOURTH EDITION, REVISED AND ENLARGED,
WITH ADDITIONAL ILLUSTRATIONS.

LONDON:
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1907.

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PREFACE TO FOURTH EDITION.

ONCE again the necessity of a further issue of this little Manual has been forced upon the authors by the flattering reception accorded to the latest edition in all parts of the world. It is both the pleasure and the duty of the authors to express their thanks to amateurs and the Press, especially that section whose purpose it is to guide the student of art, for an encouraging appreciation of their attempt to put into the form of a convenient practical handbook, the instruction in Repoussé Work imparted by them to a large circle of pupils graced by H.R.H. Princess Louise, Duchess of Argyll. H.M. Queen Alexandra was graciously pleased to accept the first copy, and many educational bodies now include this work in their list of indispensable text-books.

"I have read and profited by your admirable little book. It is the most clear and concise handbook on any subject I have ever read." "I am very pleased with your Manual. The information is so clearly and interestingly laid down that one has no difficulty." "I have never met with a trade book so clearly explained as your Manual . . . every detail that

the most inquisitive amateur might wish to know." (From New Zealand.) Such are the eulogiums that have been passed upon former editions.

The text has now been carefully revised for this, the fourth, edition, and many hints and suggestions arising from the latest practical experience have been inserted together with a few helpful notes on finishing methods. The authors trust this will tend to make the book maintain its position as the acknowledged authority on its subject.

November, 1907.

A NOTE BY LADY HUGGINS.

THE friendship of books has been eloquently set forth by Maurice and others; but the great value a book may have as a teacher has not been sufficiently recognised. For my own part, having taught myself many things with the aid of books, I think very highly of the *teaching-book*, and boldly claim for it that it fosters and encourages that priceless thing, self-help, far more than does the majority of human teachers.

One reason why I gladly agreed to write this prefatory note, is that I consider this Manual to be an excellent example of the teaching-book. While it will always be true that personal lessons from a master in any craft are most valuable, there are many who cannot for various reasons have this advantage, and by them this Manual may be accepted and trusted as a thoroughly competent and sympathetic teacher. It aims at making craftsmen—craftswomen. It recognises that even beginners can make discoveries, and emphasises the value of these to the worker and to his work; it enforces the need and importance of the primary virtues of patience and perseverance. Its advice as to tools and appliances is sound, and its instruction as to how to use the tools is plain and easily followed. The counsel offered to beginners as to choice of simple designs is good and practical; while to those who

have attained some considerable skill, the chapter on "Some Variations of Method," which reveals careful study of the work and writings of Benvenuto Cellini, will prove highly interesting.

In one class of metal work, that of fret-cutting, treated of in one chapter, there seems to me to be a wide field for useful and beautiful work in the way of door-plates, hinges, lock escutcheons, handle-plates for drawers, presses, cupboards, etc.; the cut-out design being relieved by a backing of bright-coloured leather, the metal being left plain, worked with tracers and stamps, or in places slightly worked in repoussé as taste may determine. In Gothic times, decoration of this kind was largely used with most happy effect.

But there are other reasons why I have been glad to write this note. Metal-work is required in every home, and in various other directions, and it is highly desirable that it should be of the best in both design and workmanship. Messrs. Gawthorp's work is always admirable, and has been a steady influence for the good of art in its own department; while their kindly and practical efforts to promote interest in metal-work generally among amateurs, and especially personal practice by them of the art of Repoussé, has done much to cultivate what is of great importance—better public knowledge and taste in such matters.

I will only add that there is no better antidote to the destroying social rush so unhappily prevalent, than the quiet practice of a handicraft. The working of brass or copper in simple repoussé or in cut-work, is a delightful one; and I am confident that Messrs. Gawthorp's Manual will guide any earnest student to real craftsmanship.

MARGARET LINDSAY HUGGINS.

UPPER TULSE HILL, S.W.

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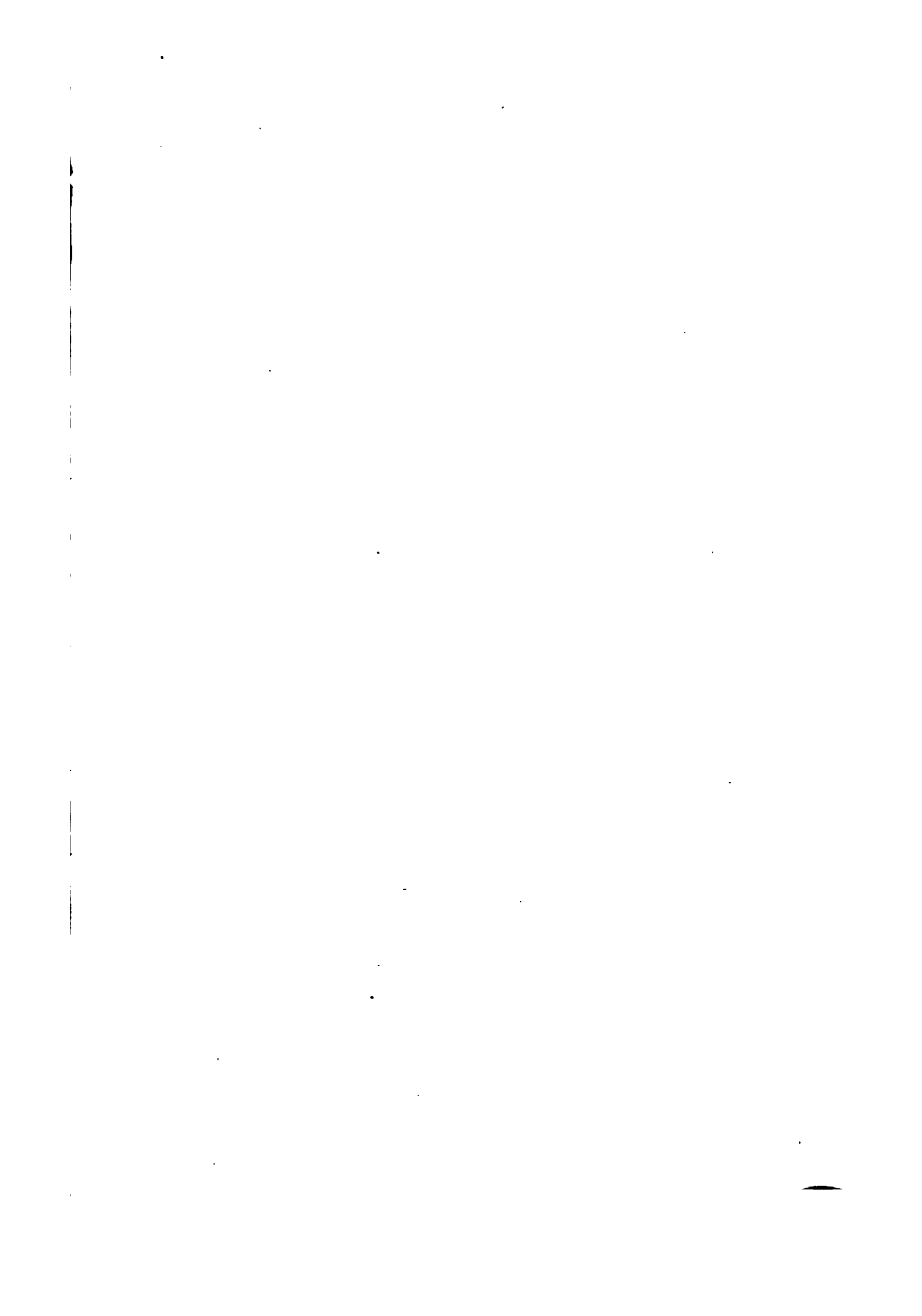




Fig. 2.

THE ART OF BRASS REPOUSSÉ.

INTRODUCTION.

OF all the materials used by man from the earliest ages, and in all parts of the globe, there is probably none the absence of which would be more seriously felt than metal, and the greater strides towards civilization mankind takes, the more does he feel the need of metal, and the more do the processes advance by which he turns that valuable substance to his own service. In Holy Writ we read of Tubal Cain, "an instructor of every artificer in brass and iron," or, according to the Revised Version, "the forger of every cutting instrument of brass and iron,"¹ and it is evident that the tribes and nations of the succeeding ages began to practise the art in which these pages are intended to afford instruction to amateurs, for we read of nose jewels and earrings among the spoils of the Midianites. Were we to continue a search through the Scriptures, we should find the art of hammering metal more and more resorted to for the decoration of vessels and buildings held most sacred by the nations of the time. One of the most notable works of Jewish art was the pair of Cherubim covering the Ark, and beaten out of solid gold. Turning to heathen nations, we find that the Assyrians brought this art to such a pitch of

¹ Gen. iv. 22.

excellence that in the ruins of Babylon there have been discovered pieces of jewellery of hammered gold in the form of heads of animals beautifully wrought. Shalmanezzer II. furnished his palace with bronze gates worked in relief with pictorial representations of national history, the remains of which were found by Mr. Rassam at Balawat, near Nimrūd, and are now to be seen in the British Museum.

Among the Greeks the art (known as "Toreutic") was largely indulged in. Who has not read Homer's wonderful description of the shield made by Vulcan for the warrior Achilles when, after a long spell of inactivity, the latter was furious to avenge the death of his friend Patroclus?¹ It is very noticeable that Homer describes with realistic song the wonderful work that can be executed with the hammer in skilful hands, while at the same time he speaks with such knowledge of the art as not to omit the important process of annealing by fire and wind. No doubt in the early Christian times there were many such workmen (*e.g.*, Alexander the coppersmith), while many interesting relics may have been hidden away in the darksome recesses of the catacombs. As, too, the Church increased, and the Roman Catholic ritual was established, so the need or desire for hammered gold and silver vessels and adornments gave a stimulus to the craftsmen in this art. Hence we find that Italy, the home of the Church, produced, amongst many others, perhaps the most notable of all repoussé workers and artists, Benvenuto Cellini, who lived from 1500 to 1570. Apprenticed to a jeweller, he showed a remarkable genius, and very soon received commissions from Church dignitaries for pyxes, reliquaries, and pastoral staves, which were

¹ "Iliad," Book xviii.

hammered and beaten by him into such perfect and exquisite form and pattern as to merit not only the highest eulogium of the men of note at that time, but also to immortalize the name of the great master. Not only was he skilled with the hammer, but with the pen also, for he wrote an able treatise on metal work. In more modern times M. Vechte, a French artist, distinguished himself by putting into his work a refinement of texture by which his productions may always be recognized. But of all the modern masterpieces none is so popular as the well-known "Milton Shield," from the hands of Ladeuil, in the employ of the firm of Elkington, of London, from whom the shield was bought by the Government to be placed in the South Kensington Museum. Let every aspiring amateur who pays a visit to London not fail to go to the Museum and see for himself the beautiful treatment of the subject, and the artistic modelling of the numerous figures. The various divisions on the shield illustrate the poet's "Paradise Lost," the central figures being Adam and Eve talking with the Archangel, whilst on other portions of the surface are views of the terrific contests between the angels and the fallen hosts, ending in the utter downfall of Satan. Below are figures of Sin and Death, and above adoring angels.

This occupation is not only pursued in our more civilized western countries, but also in the East, as, for instance, India, Persia, Egypt, &c. Benares is noted for its brass trays, vases and bowls, and the same kind of articles also come from Cairo; but one of the most popular errors amongst amateur repoussé workers is to suppose that examples from these districts are really the highest class of art work, deserving of study and reproduction by the amateur. The fallacy of this supposition will be established

if we take for example one of the large brass salvers from Benares, so well known to those who have visited the East, or collected its curiosities, and give it our careful unprejudiced attention. In the first place it is not true repoussé work (as will be shown in a later chapter), but only flat



Fig. 3.

chasing; then it will be seen that the lines are roughly chased, often irregular in form, and not properly joined up (see illustration, Fig. 3). But the scales fall from the eyes of the student when for the first time he observes the number of repeated patterns evidently stamped again and again from the same tool. Where is the art in this? Then, why are these works so much lauded, and why are they so readily placed amongst our collections of works of art? Simply because of the amount of work put into an effectively arranged design, the art being the designer's and not the chaser's. Besides this, the style of the design to western minds is quaint and grotesque, which alone is sometimes accounted art.

It is very necessary for the student of repoussé work, as he studies copies and masterpieces, to give his undivided attention to the details of workmanship rather than to those of design, for in the present day a tendency is apparent to



Fig. 4.

glorify a piece of work because it has been designed with special regard to a peculiarly favoured style, whilst the actual workmanship has been utterly neglected and is unworthy of any notice. Many such examples will be

found in current art literature and exhibitions, which have been introduced from want of practical knowledge, the design having fascinated the eye quite apart from the technical rendering.

From these remarks it will be gathered that in early times repoussé was applied mostly to religious art, works for use in and for the beautifying of the Temple, the Church, or that which stood for the central place of worship. At the same time the adornment of the person and the home claimed a not inconsiderable share of the attention of those who strove for perfection in the art, but it has been reserved for more modern workers to turn their skill to the service of purely commercial purposes. In the present day, much larger pieces and bolder effects are produced, and, though these do not display the delicacy of touch and manipulation of the old masterpieces, there is introduced an amount of skill and artistic feeling that has done something towards improving that which must of necessity be simple, plain and utilitarian.

The purpose of this book is to guide and assist those who desire to experience the delight and pleasure of becoming true craftsmen and craftswomen in their own homes, rather than those who take up the work for the more serious matter of gaining a livelihood.

ITS SUITABILITY FOR AMATEURS.

HAVING followed the progress and advancement of the art of repoussé work, and having thus come down to present times, let us consider whether this be suitable and practicable work for the amateur. Some few years ago a small number of American ladies commenced pounding away at a piece of paper-like stencil-brass with no better tool than a nail, and anything between a tack and a sledge-hammer, often sticking their nail right through the brass into the block of wood or table upon which it was placed; an improvement was the substitution of a bradawl for a nail. Then the work was taken up in England, and both ladies and gentlemen filled up spare time and otherwise wasted hours by spoiling small pieces of good brass, but it was not long before those with an artistic eye began to see how in this manner most effective and beautiful ornaments might be added to their homes. These began to cast about for proper instructions and proper tools, with the result that one or two professionals (including the writers) laid themselves out for the work, and willingly undertook the initiation of the tyro. Unfortunately at the same time some dabblers in all manner of arts (?) saw and seized the opportunity of adding to their incomes, and at once started classes and wrote articles in all kinds of periodicals, professing and pretending to teach that of which they themselves knew

little or nothing. The much to be regretted result is that there are now large numbers of amateurs working away on lead and wood blocks without the slightest knowledge of what the work should be when produced, and in the benevolence of their hearts teaching their friends and instructing ploughboys and schoolboys to improve their minds and occupy their time in turning out what every skilled craftsman would immediately detect to be worthless expenditure of labour. There is no doubt that repoussé work is an artistic employment which admirably suits the fingers of both men and women who are capable of wielding the pencil, brush, and tools, and to such who have much time on their hands it will prove a delightful change from the usual round of drawing and painting, and at the same time by it may be wrought works of art productive of far more effect, and less commonly to be found in our homes. To those who have already plunged into the mysteries of engraving or wood carving, the handling of the tools will come quite naturally. What is more delightful and interesting than to be able with one's own hands to make useful and ornamental articles which are almost indestructible, wherewith to decorate one's own sanctum as well as the more public rooms of the house? To those who take sufficient interest in the restoration or building of public edifices, and the welfare of charities, to spend their time in fashioning articles for sales and bazaars, this art will be welcomed as opening a new field from which to cull innumerable ornaments and knicknacks, which will find ready purchasers, who will depart not feeling that they have been fleeced, but that they have found something worth buying. But perhaps the best proof is in the fact that very large numbers of ladies in America and England have taken up this work, and are

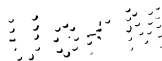
diligently hammering away with varying degrees of success, to all of whom, let it be said, by all means continue such a useful and beneficial occupation, but let them be sure that their energy is put forth in a right way, that they are, in fact, doing true repoussé work, and not mere "pounding."

In order to put such workers on the same footing as the professional craftsmen, the present manual has been penned,



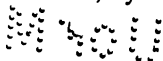
Fig. 5.

and after a careful study of it, and the necessary plodding, step by step, along the right road, there is every prospect that some day the worker may obtain a degree of success that he never would have attained had he remained contented with the pencil and brush. Having thus sketched the revival of repoussé work, we will without further delay endeavour to describe the work so that the beginner may form a true conception of the goal toward which he is aiming, and not waste his labour and genius in blind pursuit of he knows not what.



DESCRIPTION OF REPOUSSÉ WORK.

THE decoration of thin metal by means of repoussé is the most proper method that could be devised; to no other kind of ornamentation does metal lend itself so appropriately and with such an excellent result. Engraving produces a pleasant form of decoration, but is suitable alone to the smaller objects that are to be closely handled and examined, and even here, in many cases, chasing or repoussé is equally applicable, in some cases, indeed, with even greater effect. Enamelling, charming as are the effects of its colouring, is confined to an uniformity of surface that becomes monotonous, and has, besides, the great disadvantage of a liability to crack away from the metal. Moreover, should colour besides form be needed a certain degree is obtainable together with repoussé. If the reader has ever examined some of the best Japanese repoussé work or chased castings he will see exactly what can be done in this way to enliven a too unvarying hue. But, as a rule, good repoussé does not need these adjuncts, and is more than able to give by itself complete satisfaction to the most fastidious. Repoussé, then, is the decoration or ornamentation of thin metal objects with diversity of form in *basso relievo*, combining variety of light and shade similar to that produced in wood or stone by carving; in wax, clay, or plaster, by modelling; and metal, when weight and quantity are of little account, by casting; though, with regard to the latter



process it may be said that there is a "verve" in repoussé work that casting (except perhaps by the "cire perdue" process) seldom equals, and usually falls infinitely short of; this will be clear when we say that it will be found on examination that the finest silver work is repoussé and the inferior cast.

The introduction of machine stampings in silver and brass and copper-electro have confined the art of repoussé, however, in these modern days, to works of the highest class alone, that is, to those in which skilful workmanship and not value of material is the desideratum, or of which the original only is required. Much that was a few years ago hand-wrought is now struck from costly dies or electro-types (under fancy names) from models, for instance, panels for furniture, sconces, brush backs, jardinières, door-plates, &c., such as are to be seen in nearly every ironmonger's or house-furnisher's shop, and the spread of repoussé work as an artistic pastime has so largely increased the demand for brass and copper work that in no other way could the quantity required be obtained at a price sufficiently low to admit of its application to articles of such moderate cost as those to which it is frequently applied. Here it may be said that repoussé work is scarcely likely to prove a permanently remunerative occupation to the amateur, for though it meets usually with a ready sale at bazaars and amongst the supporters of the various self-help societies, it is very unlikely that he or she will succeed in competing with the large number of professional workmen, who are much better acquainted with what is required commercially, letting alone the fact that they have in many instances spent the whole of their time from their apprenticeship in shops where their opportunities have been greater, and are

able, therefore, to put a touch to their work which is clearly visible when even the best amateur work is compared with it, and to which the latter can hardly ever attain.¹ Indeed, owing to the immense amount of machine and electrotyped work, the professional, unless he is a first-class workman, finds it extremely difficult to secure sufficient employment at this branch of metal work; but to those in search of an artistic employment for spare hours that can be turned to some real and permanent use, repoussé work offers a wide field, and one which will not be easily exhausted. Like all real art work, this will prove to be progressive; excellence will not be reached at once, nor will it be found that at any stage of progress there is nothing more to be learned, no greater degree of perfection in the art to be attained. There have been some who have said that repoussé work can be learned in a few lessons or with a little practice; but we wish to be frank, and say at once that the accomplishment of any real art is not easy; it is like the prospect from an eminence in a mountainous country, there is ever a hill a little farther away which seems higher than that on which the climber is standing. Were art so easy, it would not be art. But do not let this frighten anyone anxious to commence this "fascinating work," as it has aptly been termed by many lady amateurs. There are stages in the art, and though the highest may never be reached, yet, if the earlier ones are started in the right way, they will not only be a cause of considerable pleasure to the worker, but must of necessity lead surely to more perfect workmanship.

¹ Several readers of the First, Second, and Third Editions have since stated that by a careful study of this manual they have obtained a proficiency that has even been remunerative, and a number of ladies are now known to be adding to their incomes by means of their practical knowledge of this art.

Moreover, if the objects to be decorated are chosen discreetly, there will be plenty of room for even the beginner to make use of almost his first attempts. Of course, one would not put such a masterpiece of workmanship on an ordinary coal box as on a silver or gold centrepiece or trophy, for the work should in all cases be suited to the position it is to occupy when completed; bearing this in mind, it will not be difficult to choose some suitable subject for decoration. Let the reader commence, after a few preliminary trials of the tools, with a doorplate of simple pattern, then a panel or two to enliven some inconspicuous piece of furniture, until he feels sufficiently advanced to essay a piece intended for closer inspection, and he will not be disappointed with his work. To attempt at the very first some ambitious *chef d'œuvre* is to court failure and disappointment. Advance step by step from the simpler forms of repoussé to more complex, and though a perfect mastery of the tools may not be obtained at the outset, these early efforts will not be despised. However, let it be understood that persevering effort should be made to reach a higher degree of workmanship in each piece executed, and by no means let satisfaction



Fig. 6.

with what has been done prevent improvement in the next.



Fig. 7.

To those attracted by repoussé work without a knowledge of drawing, and, consequently, nervous about trying a work termed artistic and for which they are therefore unable to make designs, it may be said that though a good knowledge of drawing is absolutely necessary to arrive at perfection and to produce original works, yet much may be done by a person of good taste who is almost wholly ignorant of the way to express his ideas with pencil and paper; all that is necessary in this case is to do what so many artizans in a like position have to do, work from the designs of others, and of such there will be found no lack, in every way suitable to the purpose of repoussé. Before closing this part of our subject it may be as well to point out that it is the object of this manual to give the reader full instructions in the art of *real* repoussé work, such as is done by the best professional workers, as altogether distinct from the trifling pastime of "brass pounding" already referred to. The

indentation of thin brass by means of a nail or other similar instrument in such a manner as to leave an indistinct pattern of dubious shape is merely such, and is in no sense whatever an art. Mr. Digby Wyatt says in his treatise on

metal work, "By the process of repoussé, which admits of a constant variation of relief and the correction of redundant form, an amount of finish can be given to subjects of an eminently sculpturesque character, such as could not be imparted to them by any other method." Lardner, in his treatise on manufactures in metal, referring to repoussé work, says, "It embodies not merely outline with bold relief, but superadds diversity of texture, surface, and even



Fig. 8.

colour." And it will be seen that the method of working last referred to does not fulfil the requirements these writers lay down; there can be no "variation of relief," no "sculpturesque character," nor "diversity of texture," but always a tame monotony and indefiniteness of surface. A person having a trained eye could at once accomplish the most that could be done in this way, and when this is possible in any kind of work it can by no stretch of imagination be termed art. The reader having now some idea

of what we mean by repoussé work will be ready to know something of the materials and tools it is necessary to obtain or make for himself, and in this section we shall endeavour to give as full information as we can before turning to the practical working, concerning which, however, we shall write at full length and with as little delay as may be.

THE SELECTION OF A SUITABLE METAL.

A SUITABLE metal to work upon will be the first consideration for the amateur, and it will be found that gold, silver, copper, brass, pewter, and iron are all in certain degrees available for the repoussé worker. Gold in its different qualities is one of the best for the purpose of repoussé, it being extremely dense, ductile, and workable, but from its cost and the high degree of skill required to produce work of a character in keeping with the value of the material we do not think it necessary to speak further of it here, but pass on to silver, which is equally tractable and, though expensive, more suitable for the amateur. It is a most pleasant metal to work upon, and if properly prepared in the first instance will bear a large amount of expansion without cracking, a point in its favour that the amateur of no very large experience will appreciate. When sheet silver is purchased it is hard, almost as springy as steel, and were it to be used in this state failure in some way or other might safely be predicted. Care must be taken to thoroughly anneal it, to rid it of the hardness caused by the rolling, and when that has been done it most probably will require flattening, and after that it must be thoroughly stoned with Water of Ayr stone to remove the bluish marks left by the steel rollers. If these are not removed before working it will be very difficult to do so afterwards, if not even impossible,

and the effect of the work will be consequently spoiled. However, we need not stay to consider this metal longer here, for it is not recommended that it be used until the worker has had some considerable experience on brass and copper, the two metals that in every way are more convenient to the amateur, and of the working of which it is the writers' object more especially to treat. Before passing to them, it may be mentioned that both iron and soft steel are much used as materials for repoussé, and in conjunction with other metals they produce very beautiful effects; but as they are both of so hard a nature and somewhat difficult to manipulate, the beginner, at least, may put them on one side, especially as he will find that to reach the standard he has probably set himself will require all his attention in copper and brass, without the extra difficulty occasioned by a less tractable material. Between copper and brass there will not be very much to choose, and it may be taken that in the instructions here following the methods referred to will answer in both cases, unless a different treatment for the one or the other is mentioned. As copper is the better and more valuable metal of the two, it should receive a somewhat higher finish than brass. In choosing brass, that of a more reddish tint (when scraped) than the usual tone will prove softer and less liable to crack (this liability, however, will depend greatly on the amount of annealing it is subjected to), and care should be exercised to select sheets free of specks and flaws, these being a cause of disfigurement in finished work and consequently of much annoyance. The most useful thicknesses of brass are from 26 to 22 Imperial Standard Wire Gauge or 6 to 10 Metal Gauge (both gauges are used in metal shops); if the work to be done is of a very elaborate character and in considerable relief the metal should be

stout enough to bear the reduction of thickness and the occasional annealings without cracking, but a thinner sheet can be used where the amount of hammering is not likely to be very considerable. Copper may generally with advantage be used of a thicker gauge than brass, being more ductile than the latter. Should the reader be unable to obtain his metal in flat sheets ready for use, he will have, of course, before starting work, to prepare it for himself, as that supplied by wholesale dealers in rolls is unsuitable in that state for immediate work. After cutting off the piece required, somewhat larger than is necessary, it should be thoroughly annealed by making it red-hot all over and then placing it in ashes to cool slowly, or when still red-hot plunging it into water, a plan adopted by some engineers, but which, when applied to worked pieces, runs the risk of cracking them. Now the metal should be carefully flattened by gently planishing it with a mallet (preferably of hide, which does not harden the metal) on a flat wood block, commencing in the centre and working out to the edges, avoiding as much as possible striking twice on the same spot. This the beginner will find requires a great deal of care, as it is very easy to make the plate more uneven than it was at first; it will often be better to bend the plate as flat as possible with the fingers, and then to rub the unevenness out with the head of a large smooth hammer, the plate resting on the flat wood block; and if the metal has been properly softened or annealed it will generally yield to this treatment. But as the metal *can* be obtained in flat sheets, the reader will do well, and save himself no little trouble, by using it in this form, especially as it is not at all necessary to be an accomplished planisher previous to learning the art of repoussé.

Another metal, both useful and easy to work and one that has come to the fore in the last few years, is pewter. Though readily beaten into high relief and rounded forms it does not take very delicate work, and also has the drawback of requiring very careful handling when soldering, as the heat of the blow lamp readily melts the pewter unless it be of a slightly harder quality than the solder used. A specially-made solder and a special flux is required, and even when properly equipped, the slightest slip will result in a hole in the metal. But for flat plaques in repoussé or for pierced designs it is a very appropriate metal, which requires no annealing, and can be sufficiently cleaned after working by scrubbing with sand, no lacquer being necessary to retain its colour.

In working pewter it is necessary to observe that it must not be removed from the cement by means of heat, for fear of melting, but the first method mentioned on page 47 must be adopted, namely, that of gently forcing it off the cold cement with a flat chisel.

TOOLS.

HAVING described the metals, we will come at once to the tools required, and it will be as well to say plainly that *any* tools will not do if the reader wishes to produce something worth doing. The right tools properly made save the amateur an immense amount of trouble, and though there are some that he will be able to make for himself, he will do well to obtain most of them from some good tool shop. The purchaser should either try the tools before buying them or get the salesman to do so for him, and he should particularly notice the "temper"¹ of the steel tools, that they are neither too hard, and thus liable to break at almost the first blow, nor so soft that the edges turn after a little use. Usually when steel tools are properly tempered they show from the middle a gradual change from a deep blue through straw-colour to a clear polished steel tint at the point. Tools having highly polished sides, although very pretty, should be unhesitatingly rejected, as such cannot be properly tempered and are liable to slip in handling. Tracers and the finer mats and punches require more careful tempering than other tools. The tools should be all light, convenient to handle, and from 4 to 4½ inches in length. The

¹ Nearly all mats, pearls, and rings sold in the ordinary toolshops are untempered, as imported; workmen usually "take them down" for themselves as they require.

first purchased should be a good steel or steel-faced chaser's hammer mounted on a proper handle. The heads can be obtained of various weights or sizes, from $2\frac{1}{2}$ oz., and are

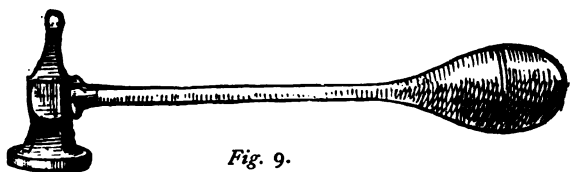


Fig. 9.

not generally used above 4 oz. For our own use one of 3 oz. to 4 oz. is preferred. The handle or stick must be of lancewood, from 8 in. to 10 in. in length, and very slender for about two-thirds of its length; the end should terminate in a knob of a flattened oval form. The illustration (Fig. 9) will give a good idea of what is needed. The great essentials of this tool are lightness, strength, and flexibility; lightness because relief is more correctly produced by a number of light blows than by a few heavy ones; flexibility that the greatest amount of variation in the strength of the blow

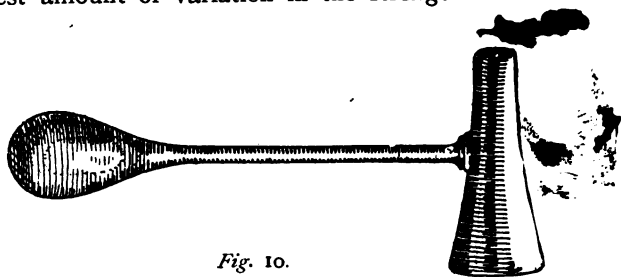


Fig. 10.

may be obtained; and strength that the stick may not break when a heavier blow is necessary. Much more depends upon this tool than is usually supposed, and it may

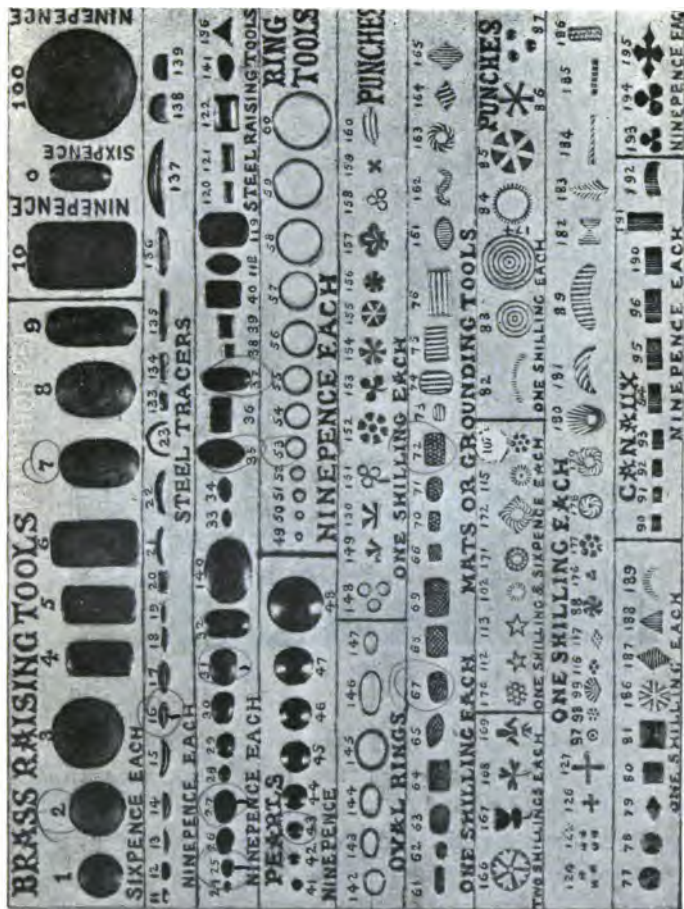


Fig. 11.

be said that with an improper head, clumsily mounted on a rough wooden handle, it is impossible to do well. A hammer, properly handled, of sufficiently good quality for the purpose, may be purchased for 2s. 6d. A boxwood mallet of the shape shown in Fig. 10, handled after the same manner as the hammer, is extremely useful, both for flattening the metal and for roughly raising large surfaces, afterwards to be further worked into form with hammer and tools; these cost about 1s. 6d. A mallet made of a

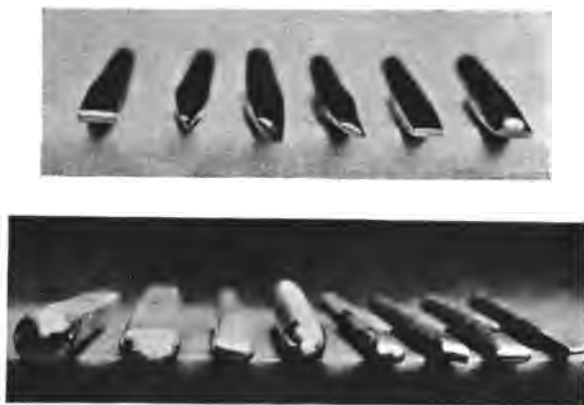


Fig. 12.

strip of hide tightly rolled up and flat at each end is also useful. Next in importance come the tracers, with which the outlining and similar processes are to be executed; they are straight and curved, thick and thin, and from $\frac{1}{8}$ to $\frac{1}{4}$ of an inch in length, according to the delicacy or boldness of the work to be done. The most useful are figured in the illustration (Fig. 11) from 11 to 23, and also in the upper row of Fig. 12. That with which the beginner

should learn to trace at first is numbered 16; this will prove to be an invaluable tool, and available for all manner of purposes. Two or three curved or straight tracers are all that will be required for the time. These, which should be purchased, cost about one penny each. A few raising tools of oval, oblong, and vesica shapes, and flat and bombé surface, the smaller ones of carefully finished and tempered steel, and the larger size of iron or brass, which, being softer, will enable the beginner to raise the metal without bruising it, and some ring tools, pearls, and mats for producing a variety of grounding and texture, complete the list that the beginner will need. The tools numbered 0, 2, 7, 16, 25, 27, 31, 35, 37, 43, 53, 67, 72, 107, and 119 in the illustration would make a very useful set to start with, to be added to as occasion demanded. Some of these also appear in the lower row of Fig. 12.

APPLIANCES.

Two appliances are indispensable—the first is the cement, or pitch-block (bowls are sometimes used), to which the metal to be worked must be attached. Unless the metal has a backing of some kind it will be very difficult to impart shape to it: and without this backing is of a proper kind, the worker will be limited to the production of ornamentation little better than a series of bruises. It will be seen at once that the backing must be of some plastic material that may at the same time give where it is required to do so, and remain firm at all other points. For this purpose both lead and wood have been tried. Lead can be used as a bed upon which to roughly knock up circular bosses or large forms, to be more carefully modelled later on. Wood is neither elastic nor capable of retaining complete attachment to the entire surface of the brass or copper (and without complete attachment little real modelling or shaping can be done), and therefore of little, if any, service for the purpose of true repoussé, and has besides the disadvantage that the indentations caused by working upon it cannot be removed except by planing; a serious inconvenience when the next piece of work has to be commenced. The only material that will answer all the requirements necessary to a proper backing, viz., solidity, elasticity, adhesiveness, and easiness of application and removal, will be found to be a compound of ordinary

pitch. There are several mixtures of this used by professional workers, and of them the following should prove, if carefully mixed, useful enough :—

	lbs. oz.		lbs. oz.
Soft Pitch	7 0	Tallow	1 0
Black Resin	4 0	Bath Brick	6 0

Or, for common use:—

	lbs. oz.		lbs. oz.
White Sand (made hot)	9 0	Resin	2 0
Pitch	3 8	Tallow	0 8

The addition of more or less tallow makes the mixture softer or harder as desired ; it is a good plan to have it of two degrees of hardness, a hard mixture for outlining and finishing upon, and a softer one for the raising process. The pitch or cement should be, for outlining, sufficiently hard to prevent the metal worked upon turning up at the edges, and yet tenacious enough to hold it until the design is outlined. However, should the reader prefer to get his cement ready made, he should have no difficulty in doing so, either in lumps ready for melting or made up all ready into pitch-blocks. A cement used by the writers and which can be obtained through them is, however, better than any of the above mixtures in regard to all the points enumerated, especially in cleanliness and easiness of removal, and as it is very little, if, indeed, more expensive than any the reader can make for himself, he is recommended to try it if possible. Having obtained, or made the cement, it should be slowly melted in a pitch-kettle, or iron saucepan, without being burnt, and, when thoroughly fused, poured out to a depth of not less than three-quarters of an inch upon a block of hard wood or flat stone, say about two

inches thick, around which a stout piece of card or brown paper has been fastened by tacks, string, or glue, to form an edging which will prevent the cement overflowing. When quite cold, remove the card or paper edging. This, then, forms the pitch- or cement-block on which the work is to be done. A block about 11 in. by 9 in. will require some two or three pounds of cement. It should here be noted that a large block is unnecessary, from the fact that, if there is much to be beaten on it, not more than a square foot of metal could be kept properly attached; this, of course, involves in large pieces of work doing only a part at a time. For all intents and purposes 11 in. by 9 in. is quite large enough to be easily managed by the beginner. The other indispensable is a cushion on which to place the block when in use. The most satisfactory form is that of a canvas bag filled with sifted river sand, not too fine but free of stones, about an inch and a half thick, and rather larger than the block. The bag, after being well rubbed over with soap on the inner side should be nearly filled with sand, three parts being sufficient. It has been sometimes objected that the noise of repoussé work is prohibitive, but were this simple appliance used there would be little ground for the complaint; besides that, the work will be of better quality where it is used, on account of the freedom from vibration. For some kinds of work which may require much turning about or tilting, an iron bowl, in shape like a half ball, and of a size from 6 to 12 in. across, filled with cement which should stand about an inch above the edge, is much used, though the amateur will find he can do very well without it. If used, it may be placed on the sandbag previously described, or in a ring of leather somewhat smaller in diameter than the bowl and about one inch and a half in

height. Some workmen use a belt of twisted straw for the same purpose.

For softening the cement and heating the plates of metal to be worked in order to attach them to the block or bowl, a Bunsen air burner (Fig. 14) will be found of much use where gas is to be conveniently obtained. It should be in the form of an upright tube with heavy base, and be fitted with a long flexible india-rubber pipe to render easy the



Fig. 13.

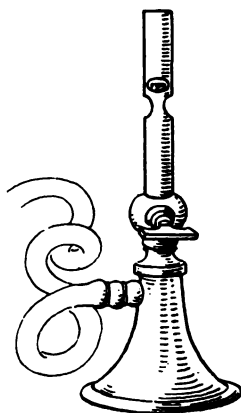


Fig. 14.

turning of the flame in any direction upon block or metal. Where gas is not easily available, and in the majority of cases, Garratt's spirit blow lamp (Fig. 13) will be found most serviceable and convenient. To these appliances may be added a smoothing iron or spatula for levelling the cement block after the work has been removed; a strong pair of steel shears, a pair of flat and round-nosed pliers for turning up or fluting the edges of trays, frames, &c., and for holding the metal when hot; a steel drawing or etching

point, a smooth file or two, a metal saw-frame and saws, a drill ; all of which, however, it is by no means absolutely necessary to have unless the worker intends to entirely complete and make up all his work into the various articles for which brass is used, when indeed it would be almost necessary to have a small brass-finisher's workshop, a



Fig. 15.

description of which is beyond the scope of this little *brochure*. A word or two on the work-table, or bench. This should be strong and substantial; a thin, spindle-legged table, or one supported only at the centre, should never be used, nor should there be any drawers in it, for not only will the vibration hinder a beginner, but a most objectionable noise results from the hammering. One lady amateur of considerable proficiency had a special table

made, the top, though substantially supported, being so constructed as to revolve and thereby render the handling of the work exceedingly convenient ; and to those who can afford so great a luxury we recommend the idea. The chair or stool—for the worker should always sit—should be of such a height that the work when attached to the cement block and placed in position on the sandbag is level with the middle of the chest. The worker should sit directly facing the light, or with the right shoulder slightly turned to it, unless left-handed, when, of course, the latter position would be reversed.



Fig. 16.

HOW TO START.

To begin work, cut off a piece of metal somewhat larger than is required, carefully anneal, except pewter, which requires neither annealing nor scouring, and flatten it as described on page 19, then thoroughly scour it, first with coarse emery cloth and oil (any lubricating oil), and then with finer cloth, rubbing it round with a circular motion until there is a fine graining on the surface: the oil should now be wiped off with a little turpentine on a rag. The surface thus obtained will be better than that produced by "sanding" or "buffing" for repoussé, and the unpleasant glare removed, allowing the pattern when scratched on to be easily seen.

Having prepared the copper or brass as directed in the foregoing, attach it to the cement block in the following manner: Take the Bunsen burner or blow-lamp (which should have the cotton filling thoroughly soaked with methylated spirit, yet not so fully charged as to run over), light it, and gently warm the surface of the cement by blowing the flame upon it, taking care to avoid burning it, when if the surface is not quite level it will gradually become so as the cement softens (the surface must be quite flat at all times to receive the metal, and a good way to get it so is after the cement has been thoroughly warmed, not melted, to turn the block cement-side downwards on to a

flat stone that has been previously damped, and then to leave it there for half an hour or so with a heavy weight upon the back of it), or this may be done with the smoothing iron, or a common poker made red hot. Now the brass



Stage A.

B.
Fig. 17.

C.

or copper must be heated (rather more than can be held comfortably in the fingers), and while both it and the cement are warm, lay it prepared side uppermost on the cement, commencing at the edge, and then press firmly all



Stage A.

B.
Fig. 18.

C.

over with a cloth (to prevent burnt fingers), until every part is in close contact, and if this has been done carefully and at the proper heat, the metal will be firmly attached without air-holes between it and the cement. A little practice and sense will master this very important process. Both metal and cement must now be allowed to cool for a while,

A. B. R.

D

and this will permit the reader to transfer his design. Of course, a beginner must select a very simple pattern; by this is meant one contained by lines of very easy curve, or perhaps it would be even better to attempt a few slightly



Stage A.

B.

C.

Fig. 19.

curved lines advancing to straight ones until a little mastery of the tracer has been gained. To transfer the selected design, lay a piece of carbon paper, such as drapers and other shopkeepers use for making their duplicates, black or



Fig. 20.

blue side to the metal, over that place the design, face upwards; now take an agate or bone point (or blunt-pointed needle) and draw it, pressing firmly, over all the outline in the pattern, being careful to prevent the design shifting while so doing. When done, remove the papers, and the pattern should appear in black or blue upon the brass or copper.

With the etching point firmly scratch in all the lines thus appearing, at the same time adding such as may by



Fig. 21.

accident have been missed. Remove the transfer marks with a little turps, and all is ready to start the first process in repoussé work. Another method, in vogue with some craftsmen, is to attach the drawing to the metal by means

of a little beeswax at the corners, and then to puncture the whole of the outlines through with a sharp point (using the hammer), the dots being just deep enough to mark the metal and sufficiently close to each other to clearly reproduce the design. In this way the transferring and pointing in may be dispensed with. Should the worker be apt with pen or pencil he may sketch directly upon the metal, and then point in with the etcher, noting that turpentine or Chinese white smeared over the brass or copper will make pencil "take" more readily, and that for ink the surface must be scoured with a little fine sand to remove any trace of grease or finger marks.

Fig. 21 illustrates the use of the Bunsen burner (Fig. 14) for heating the metal while on cement, either for the purpose of removing by heat or of ensuring adhesion to every part when attaching the metal to the cement. It would also serve to show how to melt the surface of the cement block, taking special care not to burn the cement.

(See also page 54, where this method will be useful in bringing the two surfaces of cement into close contact.)

TRACING OR OUTLINING.

(STAGE A.)

THE selected design, having been marked out by either of the foregoing methods, must now be strongly indented upon the metal. See Stage A in Figs. 17, 18, 19, 20, 23 and 24.

To do this, take the hammer in the right hand, and



Fig. 22.

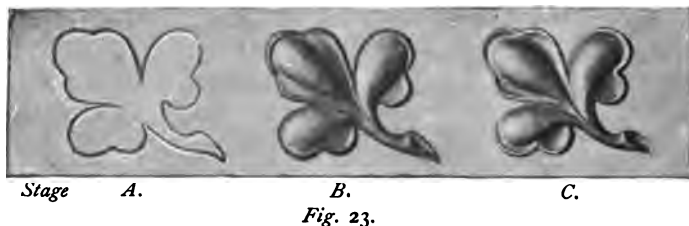
the tracer (preferably for the novice No. 16 in illustration, Fig. 11) in the left hand, holding it about an inch and a half from the cutting surface with the thumb and first finger, pressing it against the second finger, which should be about an inch below the first, at the same time resting

the tips of the third and fourth fingers upon the metal, and having all touching each other. The illustration (Fig. 22) exactly represents the right position of hands and tools when tracing; this should be carefully studied until the handling of the tools becomes familiar. To commence the tracing or outlining, place the point of the tracer next the second finger down on some portion of the outline near the left top corner of the work, slightly tilting the tool backwards over the other fingers so that the front point is just lifted off the metal; now strike the tool fairly on the top with the hammer forcibly enough to strongly indent the metal, and continue to do so with nearly the rapidity of the ticking of a Bee lever clock, and if the tool is properly held, and the blow of the hammer given from the centre of its face, the tracer will move forward towards the right, cutting a line as it goes. Care must be taken just to hold the tool with a sufficient grip to keep it from slipping out of the hand, altering its angle, or running off the outline it is desired to trace. The lines must in all cases be made by a continuous forward movement and not by punching the tool in, and then lifting and moving before striking again. Of course at first the beginner will find this more awkward to do than it appears, but a few persevering efforts will conquer the difficulties. It should be noted that much of the awkwardness will be caused by the hammer hand, more than would generally be supposed; indeed with many of the writers' own pupils this has been found the only difficulty: feeble and uneven blows first on this side of the tool, then on the other, sometimes missing it, striking the fingers instead, then a fair and central blow, the next at the edge of the hammer head, at one time the hammer turned on its side or upside down; with such

blows as these the reader may easily understand why he fails at once to make the tool accomplish his desires; and as this is a fair description of the first attempts of nearly every beginner the writers have seen, it will almost certainly apply to those now at their first trial. Some of these difficulties will be lessened if the worker uses unpolished tools and a hammer-handle with an oval knob flattened at the sides and not one that has been turned in the lathe. The knob should rest in the palm of the hand, the finger tips holding the stick lightly: at no time should the hammer be gripped as in a vice, it must be freely held and the blows given as elastically as possible from the wrist. Cultivate a regular, even blow, and the character of the tracing will rapidly improve. Many beginners endeavour to get over this process as quickly as possible, and by hurrying produce a ragged and irregular outline: this is a great mistake: professionals do not trace so very rapidly, but are careful to make lines that need no touching or correcting afterwards, and thus appear to do their outlining quickly. It will pay best at all times to trace slowly and correctly, and the result will turn out much more workmanlike.

To return to our work, trace all the lines in the pattern that run from left top corner to right lower corner, and curves that have their concave sides towards the worker, starting always at the top; then turn the block round to such a position as to bring a fresh series of lines and curves to the place of those just done. Occasionally it will be necessary to trace from top to bottom, and even from right to left, so that lines running in all directions should be practised, but endeavours should be made to work as above whenever it is possible. It will be found necessary when curves of small diameter have to be done to tilt the tool

more on its cutting point and to strike more rapidly but without allowing the tool to travel faster, indeed rather holding it back than otherwise. On taking up a design it will often happen that there are many things in it the designer has represented with lines that must on no account be rendered in such a way on the metal; shading, for instance, to give the flat pattern an appearance of relief, is often thus shown; to do so on metal which is to be in actual relief would be like painting the shadows on a statue; some lines merely indicate form, and others instead of being incised



should be in relief; so that the worker must be careful to avoid reproducing any unnecessary lines, and it may be generally taken that merely the bare outline is all that is required, all other lines being added at the last stage, when it is easier to judge what is and what is not necessary. It must be understood that one tracer will not always answer for every line in the design, and that though No. 16 has been strongly recommended to the beginner he must use his judgment and take up one of another size and even shape, such as 13, 17, 19, and 20 in Fig. 11, when he finds he can use it to more advantage and with less difficulty; in all cases when a particular tool is spoken of there will be exceptions to the general rule and some other may be found of equal or greater suitability, when there should be no

hesitation in its adoption at once. The rule must be, adopt whatever tool seems to be most likely to produce the result required, and on no account continue to use one after its unsuitability from one cause or another is apparent, because some one says that it is the right tool for a particular purpose. Some people, instead of fixing their minds on the effect that has to be produced, and selecting the tool most likely to bring about what is wanted, wish a rule laid down

*Stage A.**B.**C.**Fig. 24.*

for the use of each and every tool, thinking that it is only necessary to follow these rules and the result will come right of itself. Much of the bad work one so often meets of amateur production is more chargeable to want of thought than to actual unskilfulness; had there been any study of the design, first as to its suitability for metal, then as to the correct interpretation of the drawing, and, lastly, as to what method of procedure would most likely attain success, a totally different characteristic would have been the result. Let the amateur thoroughly study the design he intends to use before doing a stroke at it, and let him make the

meaning of every line in it clear ; then endeavour to shape the metal itself to the idea he has thus formed, and it will be discovered that though he has not all the mechanical dexterity desirable yet the result is by no means unworthy. Should the tracing not be finished at one sitting, the work must be turned face to the table (upon a sheet of paper) and a heavy weight laid on the back of the block to prevent the edges of the metal turning up during absence.



Fig. 25.

GROUNDING OR MATTING.

WHEN the use of the tracers has been mastered, and lines can be cut in any direction, with any degree of straightness or curve exactly to the outlines drawn upon the metal, the beginner may take another step and so render his work more interesting and agreeable until he can still further advance. Take a tool like Nos. 42, 50, 88, or 98, and, holding it in the same manner as directed for the tracer, with the exception that it must be held quite perpendicularly, punch it evenly all over the background of the design until only the pattern remains with a plain surface. To do this neatly requires more practice than at first would be supposed. The force of the blow from the hammer must always be equal or the ground will be more deeply sunk in one part than in another, besides giving greater prominence to the figure of the tool mark in some places than in others, a defect that will stamp the work as amateurish at once. The tool marks of Nos. 42, 50, and 98 should be quite close together, those of 88 and suchlike may be slightly separated. Occasionally the pattern may be tooled over in parts with tools 61 to 72, but this, to be properly done, will give the amateur of little experience a great deal of trouble, and should scarcely be attempted until some considerable progress has been made in the management of the tools. Flat or surface chasing is the designation of this kind of work, and much that is beautiful and really artistic can be done in this manner; of course all objects requiring a flat and smooth

surface to be retained, such as trays, table-tops, &c., must be treated thus.



Fig. 28.



Fig. 26.



Fig. 27.

Most of the Indian work so much admired is executed in flat chasing, and frequently depends on the design alone,

regardless of the workmanship, for its beautiful appearance. In many cases an apt pupil would readily equal the mechanical skill displayed in the greater number of vases, trays, &c., imported from India, but he would most probably fail in his selection of design, on which Indian work so much depends for its attractiveness. For if the rougher method of execution, which is in keeping with the style of Eastern ornament, be applied to the European type of design, the poorness of the workmanship becomes at once evident even to a tyro, and as soon as this poorness is discovered even the design loses its apparent beauty. The rough, badly-proportioned little figures, so common in Indian designs, do not readily strike one as such when executed in the way here spoken of; but treat well-drawn European figures



Fig. 29.

in the same way, and it is patent to everybody that their beauty is lost. To obtain good effects in flat chasing, the matted and plain portions should be about equally balanced; it will be, however, rather better to err on the side of too little matting than on the other, for when the matting is

overdone the design always appears attenuated and skimping. Pattern punches such as 83, 84, 85, 86, 87, 88, 97, 98, 102, 113, 115, 116, and 171 (Fig. 11) can be used with great advantage in flat chasing, if not so lavishly adopted as to give the idea that the whole of the pattern has been executed by this means. Those who feel that they have no particular talent for putting the proper relief into their ornamentation may stop at this point, and yet be in a position to usefully employ the spare time with an artistic engagement.

Figures 26, 27, 28, 29, and 30, illustrate the class of ornamentation that is most suitable for flat chasing, and many designs in the authors' various "Series of Designs for the Amateur Repoussé Worker" are specially drawn for that form of treatment.



Fig. 30.

RAISING.

(STAGE B.)

WE will now suppose the reader wishes to advance to a higher degree of skill than is required for the processes already described, and to add relief to the pattern (which, of course, must be of a proper kind) he has already traced, so that it may be distinguishable not only by its outline, but by its form and by the shadows it casts upon the background. To commence, the brass, having had the outline of the pattern correctly traced upon it (see Stage A), must be taken off the cement block : to do this all that is usually necessary will be to drive a broad, flat chisel between the metal and the cement until they are forced apart, or, should the cement be rather tenacious, to heat the metal with the blow-lamp or other means, and then remove whilst hot with a pair of pliers. Now flatten the cement on the block as directed previously (page 19), and while it is cooling clean off all the cement that adheres to the metal with a rag soaked in turpentine, slightly warming the plate if the cement is very refractory, of course keeping the rag out of the way of the flame whilst so doing, in case of fire. Should the plate have become "buckled" or curved during the process of tracing, it should be gently flattened with the hide mallet upon a smooth piece of thick wood. When the metal and cement block are quite flat, warm both slightly, and lay the side that has just been worked upon the cement, thoroughly

pressing the metal all over, until every part of it is attached as it was during tracing. Without waiting for the cooling of the block, start at once to raise those portions that are to stand up in relief by hammering them into the cement, using the largest tool that you can conveniently. To do this, commence at the points that ought to be in greatest relief, and work outwards towards the edges, holding the tools much in the same manner as when tracing, but more perpendicularly, and slipping them slowly around and along by means of the second finger, without lifting the tool off the metal (see Fig. 2, facing page 1). The sinking (or raising, as it will be when seen from the front, now turned towards the cement) should not be effected all at once, but by stages, giving a slight sinking to the whole of the pattern, and then, by going over it again, still further deepening it where necessary, until the whole looks like a mould of the work it is desired to produce.¹ No particular tools can be pointed out in *general* directions like these, but for raising large smooth objects, as a plum, for instance, the brass tools, Nos. 7, 10, and 100 are the best, while for smaller surfaces of a flat nature, Nos. 4, 35, 27, and 37, and for bulbous

¹ It has been frequently supposed that the raising in repoussé work is obtained by beating the metal into a prepared mould, and though this can be done in some cases, when large quantities of any particular pattern are desired, the cost of the mould would be greater than the single article required, and the work itself but little better than a rough stamping. However, Cellini says that Caradosso da Milano used to make a wax model of his subjects, filling up the undercutting and then casting in bronze, to be used as a mould over which he hammered thin plates of gold with steel and wooden tools. These plates were then removed from the mould, finished, and soldered together. In the Ashmolean Museum at Oxford there is a goldsmith's matrix or mould about 4 by 1 by $\frac{1}{2}$ inches engraved on four sides and of the date *c.* 600 B.C. It was found in Corfu together with gold plates such as had been hammered into its sides in this manner.

ones, Nos. 3, 8, 31, 32, and 34, are most likely to be useful. Pieces of hard wood smoothly rounded at the end may also be used.

In raising, as in all the rest of the work, proceed slowly, endeavouring to foresee the effect that the hollows are producing when viewed as raised lumps on the front side, so that no egregious mistakes are made that will be difficult to correct. To produce mere lumps will be easy enough; this, however, is not *re-poussé* work, for in all cases the object raised must have the true shape and semblance of those they counterfeit, but so arranged as to be rendered in *bas-relief* and somewhat conventionally.



Fig. 31.

To sink a given surface smoothly, and entirely without bruises, when even only of a simple hollow form, will require some considerable practice, so that for some time all complicated modellings should be avoided, and only those forms that are of simple shape, such as a cherry, or plum and their leaves, be attempted (see Figs. 17, 18, 19, 20, and 23, Stage B, and Fig. 38). For those who can model, it is a good plan to make a wax *bas-relief* of some of the most difficult portions, and then to copy them, bearing in mind that the highest points in the model should be those that are sunk deepest when seen from the

side with which our remarks are now concerned, and those of less relief proportionately less in depth. As the work has once more to be turned over and worked again on the front side, it will not be necessary to add every detail at this stage; all that need be aimed at is the attainment of a



Fig. 32.

generally correct modelling in mass; still, it should be borne in mind that very little can be done on the front side by an inexperienced hand to lift any parts that have been allowed to remain too low, so that the work should be carefully examined in detail, that such portions may be set right before the plate is removed from the block previous to

being turned over, or it will have to be attached again for this purpose. Two details of working it will be as well to mention at this stage: the one is that, when very large surfaces have to be raised, say a portion more than three inches across either way, it will be best after the tracing has been done, before attaching it to the block as described for raising, to lay it face downwards on the sandbag, or on lead, and then to beat it roughly into shape with the mallet (see Fig. 32) or large iron raising tool, or round end of hammer when lead is used, afterwards putting it on the block and completing the process as explained in the foregoing. The second detail is that, when objects, such as leaves, &c., should rise suddenly with a sharp edge from the background (see Figs. 8, 23 Stage B and 31), a strong line should be traced on the back, after the raising has been effected, just inside the mark caused by the outlining on the front, and this should be done with a thick or blunt tool, such as Nos. 14, 15, or 17; this line may be softened off with tool No. 37 into the general body of the raised part. The centre veins of leaves may be frequently done in this way, but when so done the marking of them on the front should have been omitted. It will be proper here to say that to obtain good effects in repoussé it is not at all necessary to resort to high relief, and it will be found that if the subjects chosen have been properly modelled, low relief gives a more artistic character than high relief, the latter generally causing them to appear coarse and clumsy; it is, however, more difficult to model them correctly in low relief, and to maintain the due proportion of one grade of relief to another. What is really required is the effect or appearance of high relief, not lumpiness. Sometimes when the raising has been completed and the metal removed from the cement, the amount of

relief obtained is much less than anticipated when seen from the back ; but this, unless the design calls for high relief, need not cause disappointment, provided only all is in due proportion, for by the finishing process, now to be described, the relief may be much enhanced and all the effect that is required successfully put in.



Fig. 33.



Fig. 34.

FINISHING.

(STAGE C.)

HAVING completed the raising and modelling, and carefully scrutinized every part, that no mistakes may have been overlooked, and being quite satisfied that no more can be done to it

without rather spoiling than improving it, the work may be removed from the cement in the same manner as described on page 47, when the tracing was completed. Thoroughly clean the plate, and fill up the hollows in the cement block, by pressing the spatula, which should have been made nearly red hot, into the cement, and then pushing the cement melted thereby before it into the hollows until quite filled up. During the time the cement block takes to cool again, break up a few pieces of cement and put them into the hollows at the back of the metal plate just removed. Hold the plate with a pair of pliers over the lighted blow-lamp or Bunsen burner, and so melt the pieces until they

flow, filling up the sunken portions; when every hollow is filled and the surface is quite level, allow the plate and cement to cool. When quite set, warm the surface of the cement on the back of the plate, and that on the cement



Fig. 35.

block, sufficiently to stick, and bring the two surfaces together, press them into close contact, and when cold the correcting of the modelling from the front side and the finishing may be begun. Take a thick blunt tracer, such as Nos. 15, 16, or 20, and with it, wherever the background has been lifted above the level by the beating up of the design, go round the outline of the raised parts, hammering

the tool with just sufficient force to carry the background down to its original level; at the same time, by holding the tool at such an angle (see illustration, Fig. 35) that the top is well outside the work, try to force the metal at the edge of the relief portions underneath the outline; this will tend to sharpen up the edges, and give the pattern the effect of the "undercutting" so often seen in carving. Care, of course, must be exercised in doing this to prevent the tool being forced right through the metal, causing a crack or hole that the amateur will find very difficult to mend afterwards. This undercutting process is extremely useful for the treatment of leafage designs (Figs. 8 and 31), it being the best method for bringing the edge of a leaf clear away from the background without causing it to look thick and clumsy; the chief point to be observed is the necessity for holding the tool at the correct angle, so that one side of the tool is flat on the background, and the other nearly at a right angle to it; and that if a tool like No. 15 is used, the concave side is forced against a convex curve, and *vice versa*. Of course the tool must travel along continuously, as in ordinary tracing, a remark that will apply to all tracers, raising tools, and some of the mats.

When the outline has been forced back to its original position—and care must be used not to drive it below the general surface—the marks left by the tracer may be smoothed away by such tools as 36 or 37, and should the relief already obtained appear to be of too flat a character, by commencing this at a little distance from the relief, and working the tool towards it, something may be done to bring the pattern up more prominently, especially if the blows from the hammer are given in such a way as to draw the tool along while striking it. The beginner will probably at

first find it somewhat difficult to do this evenly, and without denting or roughening the background, but if he will take care to use his hammer quickly enough to allow of its giving a second blow to the tool before the latter has entirely passed over the surface on which it rested when the first blow fell, this difficulty will rapidly vanish. The idea to be borne in mind is that a minute portion of the thickness

of the metal is being *drawn* from one spot to another. With regard to the removal or smoothing off of the traced outline, this should be done in all cases, for the work being in relief, no longer needs the line to define its shape, and all redun-



Fig. 136.

dancy should be got rid of; indeed, the only *raison d'être* of the line was to mark out the pattern preliminarily, in such a way that it would form a guide when working on the back. Now correct the modelling of the raised parts, smoothing out the bruises or marks that have been caused by the raising tools, and soften away all harshnesses, making the different forms die away imperceptibly into each other, so that the exact point where a hollow begins to change

into a protuberance may not be too clearly visible ; to do this, tools 26, 27, 34, 118, and 37 will most easily effect the purpose when concave surfaces have to be dealt with, and 36, 119, and 37 when the surface is convex. Usually the tool should be worked along from the middle towards the outer edge of the leaf, scroll, or ornament that is under treatment, and in the direction of the veins, markings, or texture. This latter point is of considerable importance, for it is not always possible to prevent tool-marks occurring, but these are rarely objectionable when in the right direction, and are frequently an advantage. Many workers will find it beneficial to use a lighter hammer at this stage of work, especially if they are at all heavy-handed and have experienced difficulty in regulating the force of the blow, for of course the whole of this process must be done lightly, and in such a way that the relief is not flattened down again, but the effect of light and shade more clearly contrasted, at the same time with the correction of errors and the toning down of all harshness and imperfection.

TEXTURES.

IF the work were left at the point now reached, in some cases it would have a metallic look about it, that is, it would produce on an observer the impression that it was metal decorated, instead of the ornamental forms first attracting his attention and then the metal base becoming apparent afterwards. Large and bold work, and all that does not come closely under notice, may very well be considered finished at this stage, but anything that is likely to be handled, or to be examined in detail, should have a yet higher finish applied to it to get rid of this metallic look. Most leaves and fruit look particularly hard, and the figure has not nearly so soft and agreeable an appearance when left with a perfectly smooth surface. To effect the change the raised forms need a texture of a suitable nature applied to their surface, and this may be given by matting them over with a blunt tracer, mats Nos. 61 to 72, and even smooth modelling or raising tools. In the illustration, Fig. 24, Stage C, and Fig. 25, the face has a texture put on in all the hollows with a small raising tool like No. 24; the leafage surrounding Fig. 1 is treated with a small blunt tracer such as No. 11; while Fig. 31 is tooled with a similar raising tool to that used on the face, Fig. 24 and Fig. 44, with a much worn mat similar to No. 61. The method is similar to that described for correcting the raising: the tool must be held nearly perpendicularly, and drawn slowly along from the centre to the edge of leaf or ornament, rapidly, yet gently, striking it with the hammer, endeavouring to produce even tracks of frosting, just the width of the

tool, but free from spottiness or single tool-marks, all lying in the direction of the veins or texture. The high lights may frequently, with advantage, be allowed to remain quite smooth, as if they had been tooled over, but the frosting rubbed out again by polishing; indeed, the texture should be applied more particularly to the hollows or parts turned away from the light. Flesh and skin may be tooled over with a blunt tracer, small oval raising tool, or a nearly worn-out mat like No. 72, but great care and skill will be required to avoid a seamy appearance. A soft, even effect will be what is needed, but more accentuated in shadow parts, and dying out almost where the light should be strongest. Some figure work, especially French, has a very nice texture imparted to it by scratching the hollows with a sharp pin point, similar to that done in etching, but more freely and closely. One large head, executed by an Italian in very bold relief, that the writers have examined, was tooled all over with a mat similar to No. 69, and the modelling at the same time corrected, the result being extremely pleasing; but this tool in most persons' hands would produce quite the reverse effect, and although a few examples of such use may be found, it will be safer to avoid all sharp or frosting mats when at work on the figure.

Leaves may be successfully treated with Nos. 62, 66, and 70 mats, with tracer No. 16, using it broadwise in the direction of the veining with a tardigrade movement, or raising tools 25 or 33 used in the same way as directed for the last. It will be well for the beginner to try all these, and when he has obtained good effects, to keep them with the number or description of the tools with which they were done attached for future reference; this will enable him to select at once the most suitable texture for any

*Fig. 37.*

particular leaf he wishes to represent. Fruits with melon or pomegranate-like skin can be rendered with a well-worn No. 72 mat, or raising tool No. 24; the former, however, is much the easier to use. Cherries, grapes, &c., may be tooled with a blunt tracer, as described for leaves, on the sides turned away from the light, but as they are somewhat difficult to do nicely, had perhaps better be left plain. The skin of snakes, scaly reptiles, and fish is best rendered with a half-round tracer, like No. 23, of different grades, but must be punched on the under side of the work immediately after the raising has been completed, and before the metal is turned over for working on the front side. For conventional animals with scales, such as dragons, a good effect may be got by using an oval ring tool,

punching it contiguously, and with its greatest diameter parallel to the sides of the portion under treatment.

There is, however, a difficulty in obtaining the oval tools to do this with, unless the worker can make them himself, or find a die-sinker who will cut them for him: it is very rarely that they can be found on sale at any tool shop. In



Fig. 38.

one of the London Exhibitions of a few years ago an Indian silver salver was exhibited, with reptiles of the chameleon type forming a kind of entwined bordering, and their scaliness was imparted in the way just described with a most satisfactory result.

Another very good method for many rough-surfaced skins, both animal and vegetable, is to punch, immediately after the raising has been completed and before removal from

block, the whole with a small pearl or raising tool (42 or 28) so closely that no particle of plain surface is left.

But the beginner will make many discoveries, and these will really be more valuable than methods he has not had the trouble of finding out for himself, so that this part of the subject may be closed with the remark that this tooling must not be overdone or a laboured effect will be given to the whole, destructive of the satisfaction that execution seemingly effortless imparts, and as it is somewhat difficult at first to determine how far to go, the beginner should take every opportunity of studying any *really good* specimens of silver, brass, and copper repoussé, more especially the former, that he can come across, and then apply the ideas so gained to his own work.



Fig. 39.

TREATMENT OF BACKGROUND.

To complete the process of repoussé, all that remains to be done is to put in a background to the work, and this is accomplished while still on the cement by punching a pattern over those parts not occupied by the design. The tool must be kept quite upright and shifted with the fingers at each stroke until the whole ground is evenly covered, taking care to strike with the same force at each blow, so that no part may be more deeply punched than another. For ordinary work a small pearl or *pointilloy* (No. 98) will prove extremely effective, besides being somewhat easy to manage. Grounding tools should, however, be used in such a way that the shape of the tool is not discernible, each mark of the tool overlapping the one made previously. Any unevenness in the grounding is very objectionable; the eye detects it at once, and is unable to withdraw itself from the place, good though the rest of the work may be. It is also disagreeable to observe that some parts of the work have been matted in a straight direction, and others circularly, and elsewhere in no particular direction at all: these results are generally caused by carelessness, and not infrequently by the impatience that so many amateurs evince towards the end of the task they have set themselves. Hurry in this art, as in any other, will always tend to injure the work, while patience and carefulness often render that of a

less skilled craftsman better than the quickly-finished piece of his more gifted fellow-worker—indeed, if the thing is worth doing at all, it is worth doing well. When the



Fig. 40.

tool used for grounding is of a distinct pattern, such as 86, 112, and the like, they should not impinge on one another, but have just sufficient space left round each to identify the pattern, yet when viewed from a little distance each mark should be lost in an evenly-distributed mass. To make the grounding

effective, care must be taken to make as striking a contrast as possible to the raised portions; thus if the latter are tooled with a fine mat the ground should be treated with a coarse one: a sharp, bright mat being contrasted against a dull, smooth one, and so on. Unless this

is properly attended to, a monotonous uniformity will pervade the work, spoiling what otherwise might have been both creditable and pleasing. Occasionally when the outlining and raising have been skilfully managed without injury to the smoothness of the background, the latter may be left quite plain, omitting the grounding altogether; but a beginner can hardly do without it, as he will find the grounding almost a *sine quâ non*, the tool-marks left outside his work requiring some such treatment to remove them. The work now, as far as concerns repoussé, is finished, and the amateur, who has taken up this handicraft for its art value and teaching more particularly, will do well to obtain professional aid in setting and making it up for the purpose to which it was intended it should be applied, provided he can do so close at hand, and without extravagant cost, as the processes through which the metal has to be put are purely mechanical, and only the dexterity of long years of practice will attain the height of finish that the workman is able to impart, especially as it will be hardly possible for him to set up all the appliances needed.

SUGGESTIONS FOR MAKING UP AND FINISHING OFF.

THERE may be some who prefer, however, to carry out the more simple mechanical processes for themselves, and for their benefit a few suggestions may here be added without any pretension to give anything like full instructions in subjects that have already been well treated in other books upon general metal work.

Besides the simple method of cutting off the required piece of metal with a small pair of hand-shears or a larger pair having one handle fixed in a vice, there are two other methods of cutting out any desired pattern. The one is well known as saw-piercing or fret-cutting, and the other is the less-known plan of chopping out with a sharp tracer or cutter.

Saw-piercing is done by means of a small saw stretched tight in a bow frame, which may vary from about four to twelve inches deep. The teeth must be so placed that they cut forward when the saw is drawn downwards. Affix to the table or bench a piece of board, having a V-shaped piece cut out of it, so secured that the cut end projects with the point of the V just off the edge of the table. Drill a small hole through each part of the pattern that is to be cut out and pass the saw through the drilled hole before fastening both ends in the frame, unless the cut-out pattern is to be

at the edge of the metal, when sawing may be commenced at the edge. Hold the metal with the left hand upon the piece of wood so that the saw may be moved up and down between the sides of the V without touching the wood. Hold the handle under the work with the frame and saw quite upright, and draw down, pressing the saw slightly against the edge of the metal, pushing the saw up freely and pulling it down as it cuts. A little thick oil or grease on the saw will make it work and cut more easily. Cut straight in front, turning the metal about with the left hand so as to keep the outline of pattern to the saw, and yet keep the saw within the V.

The other method is very similar to tracing, except that the tracer should be sharper, longer, and larger and the hammer heavier and used with rather more force so as to cut right through the metal, which is secured on the pitch just as for tracing, or it may be done upon a block of lead. The object in view must not only be to chop out the pattern but to turn down the edge at the same time, the chief advantage of this method being that it leaves the work with an apparently thick edge, which is much more effective than the thin edge left from the saw. The somewhat rough condition of the edge is no disadvantage to good work, but is preferred by most artists.

To know how to join various pieces of metal together will be found extremely useful. In many cases two edges may be overlapped, or an angle piece may be placed against a flat surface, and the two riveted together. Pass a small metal pin, screw, or rivet through the two pieces right up to its head, and then on the other side cut off all that comes through except about the thickness of a stout piece of paper. Place it all with the head resting on an anvil or block of

iron, and tap upon the cut end of the pin with the chaser's hammer until a head is formed sufficiently large to hold the metals tightly together. When soldering is necessary, the edges or parts to be attached must be filed or scraped clean and bright and must not be fingered. Take a soldering fluid, which may be purchased ready prepared, and is a mixture of muriatic or hydrochloric acid (commonly known as spirit of salts) and sal ammoniac, "killed" by the insertion of pieces of zinc, and touch the edges of the metal with it, taking care not to get any on the fingers; this will make the solder flow all along the clean edges where touched with acid. Resin is used for soldering lead, instead of acid. Next heat a tinman's soldering iron till nearly but not quite red-hot, dip the copper tip or "bit" into the acid and then touch it with a stick of tinman's solder (about two parts tin and one lead) so that the solder flows all over the point of the "bit." If too dirty, file it bright, and dip it in the acid again, repeating the tinning process. Whilst the iron is still hot, run its point along the joints, touching it now and again with the stick of solder dipped in acid, until the solder easily runs along the joint as fast as the iron is moved along it. When the solder stops flowing, either the metal is not clean or the iron is too cold. The iron must be retinned each time after heating. The success of such a joint depends upon considerable practice, perfect cleanliness of the metal, and a proper degree of heat. After soldering, wash the article in hot water to get rid of the salts, which if left on "sweat out" and corrode the metal.

There are various methods of producing a dull or bright finished surface to brass or copper articles, and although the finest polish can only be obtained by steam-polishing, which is altogether outside the amateur's province, it is

quite possible to obtain a presentable appearance without machinery and with very simple implements. The first thing to do is to get rid of the pitch and grease that may still adhere, and this may be effected by slightly warming the metal and wiping off as much as possible with a rag and oil or paraffin, and then by boiling in a solution consisting of one pound of potash to a gallon of water. The article should not be fingered, but suspended and handled by means of copper wire. If this does not remove all traces the article may be scoured with a scrubbing brush and sand and again washed in the potash. Next insert in a bath of "pickle," leaving it there for several hours according to the strength of the "pickle," but care must be taken not to leave it long enough to be corroded by the acid. A simple precautionary reminder is to chalk on the work table the name of the article and the time at which it was put in the bath. The "pickle" bath consists of old aquafortis (three parts water to one acid) and is the better for containing a slight solution of copper. When taken out of the bath it will be found to be coated with a black scale, and should be immediately rinsed in clean water and scrubbed with sand. The article will now be ready for the final dipping, a process which requires the greatest care. Attach a piece of copper wire by which to hold it and then quickly plunge it into a bath of aquafortis, completely immersing every portion of its surface; as quickly withdraw and thoroughly wash in plenty of fresh water, when it will be ready for polishing or scratchbrushing.

A polish not equal to that produced by steam-polishing, but quite bright and even enough to satisfy most amateurs, may now be obtained by rubbing with rotten stone and oil, well worked in straight lines with a piece of felt or thick

cloth stretched over a bung or a piece of wood, and finally rubbed off with a soft clean duster of fine texture or a rouge chamois leather. With the exception of "Bluebell" and any other paste that smells of paraffin, polishing pastes cannot be recommended, as the acid they mostly consist of will too soon set the metal tarnishing again.

Scratchbrushing is usually performed on a lathe, the scratchbrush being in the form either of a circular wheel of wire ends or a number of wire brushes attached round a circular chuck. According to the delicacy of the work and the finish required so must the brush be selected, as brushes are made in various degrees of hardness and fineness. The amateur will find that a fairly good finish may be obtained by using a wire scrubbing brush in the hand and thoroughly scouring, moistening the brush by frequently dipping into a mixture of stale or old beer and a little cream of tartar, thus producing a fine lather with which to give the surface a good brushing. Lastly, well wash in clean water and dry off in hot beech or hardwood sawdust.

Scratchbrushing is most suitable for flat panels or trays, while for raised work with intervening hollows and spaces smaller brushes in the form of longitudinal bundles of wire must be used. The brush must be moved with the utmost rapidity but not with too much pressure, as the proper effect is produced by the sharp ends of the wires, which should not be pressed down too much. Immediately after this process the metal must again be cleansed in water and dried off in hot sawdust, and it will then be ready for lacquering. It may be necessary to add that the scratchbrush must consist of wire of the same metal as that upon which it is to be used.

Copper, when chemically clean, may be bronzed in various

shades of green, brown, and black, but the processes are difficult and unpleasant. The professional bronzer finds enough in the art to demand his whole skill and attention, so that the repoussé worker would be well advised to leave this to those who have made it a special study.

A certain amount of colouring of a dead reddish hue may be produced by heating copper with a spirit blow-lamp up to red heat, plunging it into cold water, and then brushing it up with red chalk, but there is always a risk of cracking the metal. Another method, the result of which is not always artistic, is to varnish the surface, and when tacky to dust it over with gold, silver, or bronze powder or to paint it with these powders mixed with goldsize. Nothing can equal in artistic beauty the effect of time and atmosphere, but much can be done with chemical mixtures to imitate the same appearance, whether brown, black, or antique green, and, as stated above, the manipulation of these chemicals has been brought to a fine art.

It may be useful to quote a few of these mixtures and the manner of using them for the benefit of any who may care to try them, but it must be remembered that practical experience alone will command success in the use of such chemicals.

BLACK BRONZE.

Smoking Salts	7 lbs.
White Arsenic	$\frac{1}{4}$ lb.
Black Antimony	10 oz.
Copperas	2 oz.
Verdigris	1 oz.

When mixed always shake well before using. Dip the copper into the bronze until it is black, wash and lightly scratchbrush it; quickly dip it once again in the mixture,

dry off and lacquer. If the article is too large to dip use a soft hoghair brush.

BROWN BRONZE.

Fluid Ammonia	$\frac{1}{8}$ oz.
Nitrate Ammonia	$\frac{1}{16}$ oz.
Salts of Lemon	$\frac{3}{8}$ oz.
Carbonate of Potash	$\frac{1}{4}$ oz.
Vinegar	$\frac{1}{2}$ pint.

Damp a rag with the mixture and wipe it thoroughly all over the copper, leaving it to dry exposed to the atmosphere. When the hollows have assumed a greenish brown the reliefs may be rubbed off or left dark as preferred. Less acid and more exposure will be most effective. Lacquer when a desirable tone is acquired.

BLuish BROWN BRONZE.

A teaspoonful of hydrosulphate of ammonia in a tumblerful of warm water.

Wash the fluid over the metal with a soft brush until a bluish brown colour is obtained, then wash off and dry. Brush up dry, rub off the high reliefs, and lacquer.

This should be done in the open air owing to the strong and offensive smell.

ANTIQUÉ GREEN BRONZE.

Ammonium Carbonate	112 grs.
Ammonium Chloride	38 grs.
Water	2 ozs.

Brush over and leave for twenty-four hours before repeating the process, then dry slowly in open air and rub off surface. This will leave green in the crevices and hollows, creating an antique appearance.

With a few simple appliances it is possible for the amateur to attempt to lacquer the metal in order to preserve its

polish. A small quantity of pale gold lacquer, and a good camel-hair lacquering brush about one inch wide, are the chief requirements. Wash off with turpentine any grease that may be upon the article, and rub it quite bright with a soft cloth or leather, and then, handling it with such care as to avoid fingering the bright surfaces, warm it on a hot plate or over a Bunsen burner to such a heat as can be just borne by the hand. Having dipped the brush in the lacquer and wiped off any drips, brush freely across the article backwards and forwards, trying to avoid streakiness, until a thin coat of lacquer is distributed evenly all over the surface of the article. Let it cool, and if bright iridescent colours appear upon it, there is not sufficient lacquer, and the process should be repeated, but not so as to make it look thick and sticky.

Many articles may be greatly beautified by the use of simple and inexpensive enamelled porcelain roundels or plaques, which are now made in art colours such as shaded greens, peacock blues and carmine. The method of insertion whether round or oval is very easy and is accomplished by cutting a hole rather smaller than but of the same shape as the plaque to be fixed. The edge surrounding this hole must now be slightly raised on a bevel from the back so that the enamel will fit in almost flush at the back; when in position two small strips of metal should be placed crosswise over the back and soldered to the surrounding metal, or if preferred the back may be entirely covered by a piece of metal rather larger than the hole and then soldered round the edge. The result will be that the enamel will slightly project from the surface, producing an effect both in form and colour that will greatly enhance the execution of the whole design.

The following list of articles that have been made by amateurs, and that often command a sale at bazaars, may be found useful :—Alms dishes, ash trays, bellows fronts, blotting books, blowers for fireplaces, brush backs, buckles, cake stands, candle rings, candle shades, candlesticks, caskets, coal boxes and buckets, crumb scoops, door furniture, escutcheons, fancy boxes, fender stools, fire screens, flower pots, glove boxes, handkerchief boxes, hinge fronts, jardinières, kettle stands, match-boxes, menu-holders, mirrors, muffineers, panels, paper racks, photo frames, plaques, puff-boxes, sconces, serviette rings, spill cups, teapot stands, trays, trivets.

SOME VARIATIONS OF METHOD.

THE foregoing instructions apply to most of the work that an amateur is likely to attempt, and more satisfactory results ensue from closely following the order of procedure therein delineated ; but occasionally a slight variation, according to the nature of the work to be done, has to be made, for instance, in the case of a bowl or vase that allows only of its outside being operated upon with the ordinary tools. In such a case there are two methods for obtaining the desired result, and the following will be to the amateur the easiest and most successful. The bowl or vase must be filled with cement, laid upon a sandbag, and then the design outlined, afterwards the ground surrounding the pattern must be sunk by rather heavily matting it with a suitable punch or mat, commencing at the centre of each space, and working the tool towards the design to be left in relief. At each blow the metal will expand, and as the blows are directed towards the centre and consequently contract the circle occupied by the parts worked upon, the metal over and above that which the reduced circle will contain is forced into those parts untouched by the tool, thereby bringing them into relief without once touching them from the back. This process can also be applied to flat panels when no great relief is required, but will prove more difficult than in the case just stated, for there being nothing to prevent the

whole plate expanding, a good deal of practice is necessary to find out the knack of making it do so just at the point where the extra surface gained by the expansion will be absorbed by the parts to be in relief instead of being lost in a general increase of the size of the plate. The relief thus gained, both in the case of the bowl and in that of the panel, must then be carefully chased and modelled into proper shape in the same way as explained for correcting the

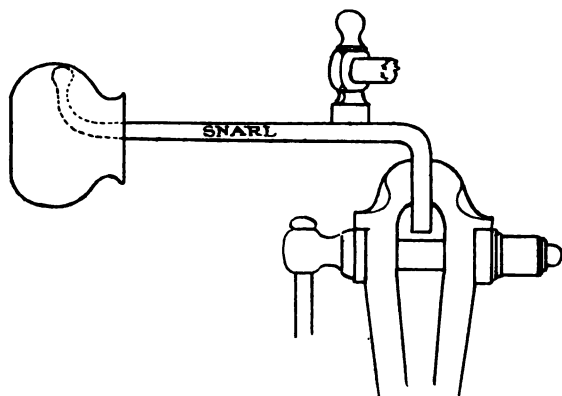


Fig. 41.

raising in ordinary repoussé. The second method requires the use of a tool called a "snarling-iron," which is merely a stout bar of iron or steel, having an inch or two of its length turned down at right angles at one end and a round knob turned up at the other. Various sizes of snarling-irons are necessary. The turned-down end is placed in the jaws of a strong vice, and the vase, with the design drawn upon it, is passed over the knob and held firmly in such a position that the knob inside the vase is exactly under the part to be raised; then a second person with a heavy hammer

strikes the snarling-iron near the vice smartly: the force of the blow will travel along the iron and be communicated thus to the underside of the pattern on the vase, and thus by repeated blows and a skilful shifting of the vase as the pattern demands a rough relief will be gained. This, like that attained by the other method, must be properly chased up.

Cellini evidently used a somewhat different snarl from that described in the foregoing, for he describes it as a sort of anvil with long horns, long or short as required, fixed in a block similarly to an anvil. The point of one horn was rounded like the top of the little finger and turned upwards. The vase was then placed upon this point whilst the other horn was struck with the hammer, making the first-mentioned horn vibrate under the metal, causing that part of the design touched by it to bulge and rise as desired.

After the amateur has gained some little experience, and is able to repoussé an ordinary pattern correctly and with dexterity, the labour of working large designs of a simple character, intended for positions that do not allow of minute inspection, and whose effects are to depend largely on their boldness, may be somewhat reduced by omitting the outlining process altogether and commencing the raising on the back at once. This involves the design being drawn on the back instead of the front, and consequently backwards, which can be easily managed by laying a piece of tracing paper over the design, tracing it off, and then transferring the design from the tracing paper (laid face to the metal) as previously described. Point the design in with the etcher, or as described on page 35, and commence to raise the work as if the outlining had been done, and afterwards proceed in the usual way, with the exception that the

outlining with the blunt tracer must be done entirely round the whole design instead of only at those parts of the background carried by the raising beyond their true level. This saving of labour, however, should scarcely be attempted by a novice, certainly not by anyone insufficiently accomplished to execute an ordinary piece of work properly in the usual way, nor should the method be used in work of an elaborate or difficult character.

As salvers or bowl-shaped dishes ornamented with repoussé work make such good decorative pieces, the student perhaps may find Cellini's method for bowl-making useful. The metal should be about one-and-a-half inches wider than the diameter of dish required, and cut to a circle. From the centre strike a number of circles about three-quarters of an inch apart, extending from the middle of the circumference. Using a hammer with a face about one inch over and the small knob at end about half an inch over, commence hammering upon the centre of the sheet, being careful to renew and not lose the centre mark, striking continuously in a spiral around the centre, using the circles struck as guides. Beaten in this manner, the metal will spread out in the form of a basin. Then, using various anvils or stakes suited to the inside form of a cup, continue hammering with face and knob of hammer until the metal is formed to the shape desired, and if no great depth is required the task will be fairly easily accomplished. The rim or edge will need carefully planishing upon an anvil to make it smooth and even, when the edge may be clean cut and sharply turned up.

HINTS ON MAKING AND SELECTING DESIGNS.

AND now a word or two on the making and selection of suitable designs for repoussé work. It will, we think, be unquestionably admitted that for any piece of work to be regarded as artistic the design from which it is executed must be of a character suitable to the method by which it is carried out, and yet we have frequently seen publications, claiming to supply amateurs with real art designs, which the authors say are equally applicable to repoussé work, poker painting, or needlework, each of which require totally different tools, materials, and manipulation, and produce results not resembling each other even in the faintest manner: hence it is quite evident that the designer can have no real knowledge of the art for which he draws, and consequently is unable to produce suitable and, therefore, artistic designs.¹ Another set of draughtsmen seem to think that art lies in peculiarity, general ugliness, and carelessness of shape, especially when designing for "brass-work," as they call it, and even some of our well-known and undoubtedly clever designers appear to have very little idea of the capabilities of metal repoussé, and consequently deem patterns a child could execute with a bradawl after five or

¹ Since the true worth of repoussé has been more generally appreciated some of the art publications, notably "Home Art Work," have issued designs eminently and specially suited to this work.

ten minutes' instruction quite good enough for the purpose. The writer has known work after such designs accepted for



Fig. 42.

public exhibition by these artists, while others requiring a knowledge of modelling and no little skill in workmanship were rejected. The majority of other designs noticed were

of such an attenuated, spindly, and weak character, mostly poor naturalistic copies of some creeping plant or other, as to be quite unsuitable for production in metal, whatever else they might have been adaptable to. The great fault, however, has generally been that the designer did not know whether he was drawing for raised or flat work, and, of

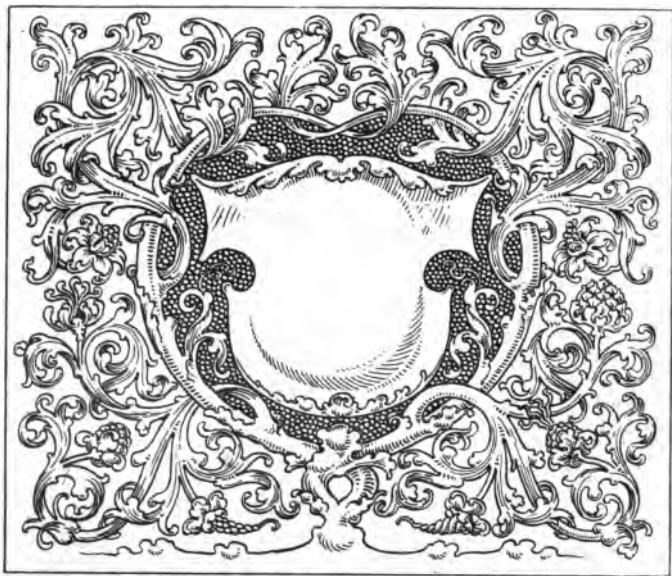


Fig. 43.

course, such a design the workman could hardly be expected to turn to very good account. All such as these should be avoided as not worth the trouble of reproduction, for no matter what pains are taken with them they are unlikely to turn out well. As a rule a conventional design, or, at any rate, nature arranged and conventionalized, produces the best results in metal, care being taken that the background

and the pattern are about evenly balanced; if either outweigh the other it certainly should not be the background,



Fig. 44.

as this will give a weak appearance to the work. For flat chasing, geometric, arabesque, and Moorish patterns are

the best, while for raised work, figures, grotesques, conventional ornaments, leafage and fruit prove most effective. In choosing or making a design, particular attention should be paid, firstly, as to whether or not it is suitable for metal at all; next, whether by raising or flat chasing its proper effect is most likely to be brought out; and, lastly, if for raised work, whether the drawing is so carefully made that the correct modelling is apparent. Unless this is the case, an amateur of little experience may commence a pattern he is unable to finish from not knowing how it should be raised. Perhaps a beginner might find designs in the *altdeutsche* style (see Fig. 43), now revived and much used throughout Germany, the easiest and most effective for his use when modelled or raised work is required. French and Italian Renaissance should only be used by the more accomplished amateur, as the delicacy and airiness of the modelling these styles require are by no means easy of attainment. Should the worker have the advantage, an immense one over those without this talent, of being a skilful draughtsman, let him find out in what style he can work most effectively, and then make his own designs suitable to the degree of skill he acquires, while doing so carefully thinking out how each portion must be worked. and though the designs may not be equal to those of a professional designer, yet his work will be of a better character than that by a mere copyist from another's design. One of the best magazines of designs, both for brass and other work, is that edited by Mrs. Conyers Morrell, called "Home Art Work," one shilling, quarterly.

An amateur anxious to attempt figure work should examine the many copies of salvers, vases, &c., executed by Morel Ladeuil, and others exhibited in the South

Kensington Museum, as more will be learned from such studies than from many a learned treatise. It may be pointed out that such figure and ornamental work as was designed by Flaxman for Wedgwood ware would form excellent studies for repoussé. Several of the Italian



Fig. 45.

modellers (Brucciani, in London) keep most excellent casts of work that has been executed in repoussé, or is extremely suitable for reproduction by this method, and an amateur anxious to do the best work he can would do well to procure one or two. When drawings are not quite the size required, they may easily be enlarged or reduced by means of the pantagraph, obtainable anywhere, or by dividing the

pattern with lines into a number of squares, and measuring out the space to be occupied by the pattern into the same number of squares, and then copying the portion of the



Fig. 46.

design enclosed by each square into the corresponding square on the surface to which the design is to be transferred.

An attempt has now been made to give as fully practical

instructions as possible, and if the necessary time, care, and trouble are expended in following out the lines indicated, a certain amount of success must follow. Of course, the reader with the greatest amount of artistic sympathy will naturally advance faster and to a higher level than those with less artistic perception; but none need be afraid to try their hand, for hardly ever will there be failure to create something pleasing and worth the trouble taken.

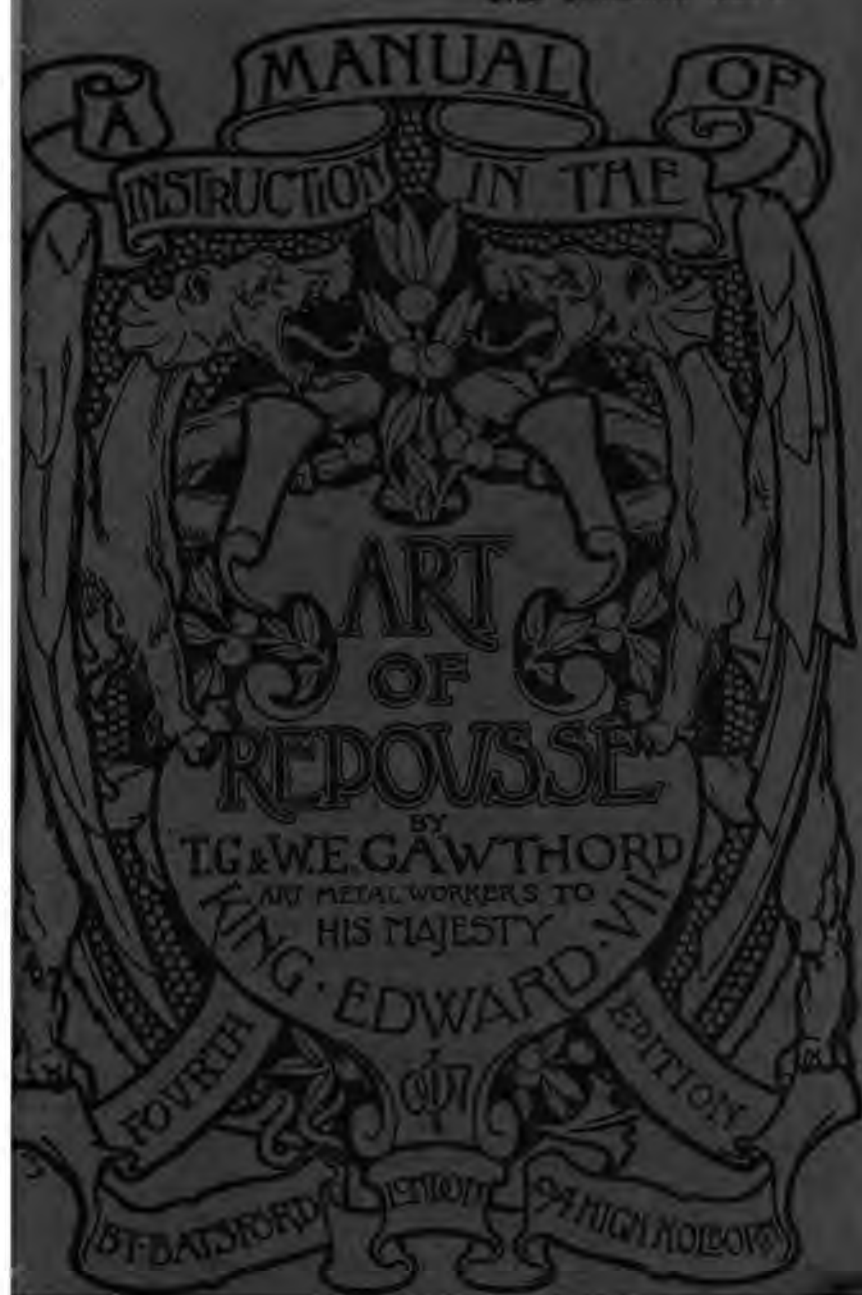
It only remains to assure the would-be repoussé worker that assistance in the selection of proper tools, materials, and designs; advice as to the setting of amateur's work; and hints on the avoidance of mistakes, &c., can always be obtained at Gawthorp and Sons' Metal Works in Long Acre, where most of the originals photographed for this "Manual" may be had on loan for the purpose of copying, and where the luxury of private lessons may be indulged in.

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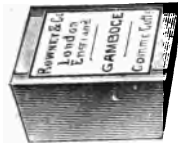
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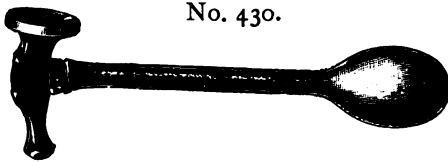
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